# The Trade Review and Western Machinist.

FIFTEENTH YEAR.

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THE threatened strikes have come off, the most extensive yet experienced in the iron trades of the West. The Pittsburgh iron manufacturers having refused to sign the scale, their 18,500 men have relapsed into idleness, and taking Pittsburgh, the Shenango Valley in Pennsylvania, the Mahoning Valley in this State, Wheeling and its vicinity, Western Virginia, upwards ot 40,000 persons are without work. So far, five firms have surrendered to the Association, the most prominent being Carnegie Bros. & Co., of Pittsburgh, who employ 1,000 men. In Cleveland the Union Iron Company alone has yielded. The steel manufacturers not being seriously affected by the claims put forward, are expected to continue work. The Cincinnati mills continue running, in accordance with an outstanding agreement, which the Amalgamated Iron and Steel Association has thought it wise to enforce. At St. Louis several leading works have shut down. We refer readers to our market reports for the position of the iron trade. The very extent of the strike augurs a brief continuance. The general body of manufacturers are resolute in their determination not to surrender.

WE are on the eve of the full development of another monopoly in the coal and iron of the Hocking Valley, the magnificent deposits of which represent untold wealth in the future. The leading spirits in the movement are members of the Standard Oil Company, who some time ago incorporated at Columbus, the Standard Coal and Iron Company with a capital stock of $75,000,000. The agents of the Company have since been persistently engaged in getting all the options that were available on coal and iron lands. Having pretty thoroughly carried out this work, the present depression of the iron trade is the signal for closing up a good proportion of the options. In this Company such men as Ames, Ballou, and others of Boston, James G. Blaine, Governor Foster, General Samuel Thomas, Colonel C. H. Rippey, William Moneypenny of Columbus, and W. D. Lee, of Newark, were incorporators, and most of the large operators and many capitalists in the East are interested parties to the extent of large blocks of stocks. Governor Foster's late visit to New York was to attend a meeting of the leading men interested in the movement, being held there not only as a convenient point for the meeting of Eastern and Western members, but to arrange with bankers and brokers for the placing of their bonds on the market. Of these bonds upwards of $3,000,000 have been already placed, and they have now the means for disposing of securities and putting up for any options that come along. The very fact of that Pactolus of wealth, the Standard Oil Company, possessing a controlling interest, gives an endorsement to the securities which will sustain them above par, even in the present collapsing condition of the stock market. It is in the extent of the Company's preparatory operations that its strength lies. Its options, first obtained secretly, are now secured openly. These options extend not only to coal and iron lands but to furnaces and other properties. The Standard Coal and Iron Company will presently represent a monopoly in the strictest sense, and, what is not surprising, it designs using the power it has acquired to dictate to the Ohio railway companies the rates of transport for its products, thus adopting the same policy by which the Standard Oil Company grew to greatness, and succeeded in scooping up enormous wealth to the prejudice of individual interests. Owners of mines and furnaces in the Hock Valley who have not conceded options are looked on as fair prey, who must yet submit. The prospect is that railroads leading into the Hocking Valley must either come to terms or sell out to the Company. The Ohio Central Railroad Company and its thirteen thousand acres of coal lands are already in the Standard with secured options, and also, all the furnaces owned by Thomas and his associates. When this Company gets in operation it will come directly in competition, if not in collision, with the Cleveland syndicate now controlling the Columbus, Hocking Valley and Toledo Railroad, and over ten thousand acres of mineral land. The manager of the Company is Mr. Walter Craft.

This coal and iron company has from the first of June acted in its own proper character, throwing off all disguise. The reason of the secrecy that has characterized its operations is easily found in the better bargains it was enabled to effect so long as the full scope of its schemes were not developed. We are told by several of the proprietary that the Company will be enabled to render the coal market steadier, which means that they will more effectually control the output; also that they will be enabled to lessen, if not altogether dispose of the labor troubles among the coal miners of the States, which simply means that as compared with individual proptietors with divided interests, they will be better able to withstand dictation from the men. The next few months will witness important additional acquisitions by this Company.

THE influence of the copper supplies of Arizona and New Mexico, and the certainty of their increase, is steadily weakening the position of the Lake Companies, the more so that the copper from those quarters is offered at lower figures than those demanded for Michigan copper. Our mining advices tell of new copper developments, and capital is readily forthcoming to develop new properties. The Lake companies some weeks ago contracted to deliver at New York a large quantity of copper for shipment to England at 16 cents, but in view of the supplies from other quarters their sales to the English market cannot, as formerly, materially affect home rates. It may be that their most effective movement will be in seeking to bring about a general combination among copper producers, with the view of regulating the output and so controlling the market price, but this will be a work of time, and as with the coal operators of Pennsylvania up to a comparatively recent time, it may prove a difficult matter to get all parties to abide by restrictive agreements. Such a combination, in fact, is likely to prove essentially weak. With a production of copper of upwards of 25,500 tons per annum, the United States is following closely on Chili and Peru with their 34,000 tons, and in a few years, instead of being the second, this country will be the first in the world's production of the metal. At the same time the relative proportion of production of the Lake Superior mines, which in 1880 constituted 83 per cent of this country's product, will be reduced even with a much larger output. The increased skill brought to bear on copper mining, and the improved machinery, is as available for Arizona and New Mexico undertakings as for Michigan, and serves to equalize conditions short of distances. Colorado, Idaho, and California will largely add to their production, and could most profitably do so withot the stimulus of present adventitious rates. Increased facilities for ore smelting and transportation will aid in bringing up the product of the new copper region. It is these enlarged prospective supplies, as well as present deliveries, which have induced a decline in the copper market.

WE have received from Mr. Joseph D. Weeks, one of the Editors of the *Iron Age*, a pamphlet containing his pleadings before the Secretary of the Treasury, together with those of R. C. Parsons, as representatives of iron and steel associations, in appeals against the decisions of the Collectors of New York and Toledo as to duty leviable on splayed hoop iron and car axles. The publication is opportune. We fully expect that these full and complete representations of the law will result in a decision that will be satisfactory to our manufacturers. The clearness and cogency of the arguments by which Mr. Weeks demonstrates that the action of the Collector of of the port of New York was right in assessing duty at the rate of 1½c. per pound on so-called splayed iron hoops could not be exceeded. We quote the following from the pleading of Mr. Wells:

It is no forced assumption to assert that this article was once hoop iron, and it is evident that if it is still hoop iron it must pay the hoop iron duty. Now, has it ceased to be hoop iron? Has such work been done upon it, has it undergone such manipulation as to take it ont of the category of hoop iron and make it a manufacture of iron "not otherwise provided for"? This is the vital question. Now what has been done to this hoop iron? First, It has been cut to length. Second, It has been punched once. Third, It has been flared or splayed. This is all; and if it has ceased to be hoop iron it is because one or more or all of these things done to it has so changed its character or its economical use that it is no longer hoop iron. In the first place, has cutting it to lengths taken it out of the category of hoop iron? In the Act classifying hoop iron for duty, the dimension of length is nowhere considered; it is width and thickness, and so far as dimensions are concerned, width and thickness are the only ones considered. Hoop iron, if it has the proper width and thickness, is hoop iron, no matter what its length. In the process of manufacture it is produced of various lengths in the several sizes. As Judge McKennan, in a recent trial of a hoop iron case in the Circuit Court for the Eastern District of Pennsylvania, in defining the meaning the meaning of the expression "all hoop iron," pertinently remarked: "It is not certainly confined to hoop iron of any particular length, but it is to be classified according to its character—whether it is hoop iron or not—irrespective of its length." Language very similar to this was used by Judge Hopkinson in the case of the United States against Sarchet, tried in 1832, involving the duty on certain pieces of bar or bolt iron cut into lengths of eight or ten inches, and claimed to be a chain link, or a mannfacture of iron not otherwise provided for. The Judge held that this cutting of pieces of bar and bolt iron to "lengths did not change their quality, their character or their denomination." Now, does punching a hole in the hoop iron remove it from the category of hoop iron? This Department, not only in many similar cases, but in the case of hoop iron itself, has so often decided that punching iron and cutting it to lengths, neither of them nor both together change the classification of a piece of iron, so that that may be taken as a fixed rule of the Department.

Then as to so-called forgings for axles on which the Collector at Toledo assessed duty at the rate

of 2½ cents, instead of the duty that would have been leviable under manufactures not otherwise provided for, Mr. Weeks observes:

We contend that these forgings are "axles," dutiable under the following provision of the Tariff Law. "Blacksmiths' hammers and sledges, axles, or parts thereof, and malleable iron in castings, not otherwise provided for: two cents and a half per pound." On the other hand, it is claimed that these are not "axles," but that they are "iron forgings for car axles," dutiable under the clause: "All other descriptions of rolled or hammered iron, not otherwise provided for: one and one-fourth cents per pound." That these articles are "rolled or hammered iron" there is no doubt, but so is also nearly every form of iron mentioned in the Tariff, except iron ore, pig iron and castings. Bar, boiler, plate, sheet, hoop, band, round, slit, iron railway bars are all "rolled or hammered iron." In this connection may I quote the words of the distinguished Assistant Secretary of the Treasury, Judge French, in the decision on "Iron Car Truck Channels." "Schedule E of the Tariff was intended to cover by specific enumeration all the forms of iron, as far as practicable, which were known to commerce at the time of its enactment, and which were practically material for use in the manufacture of other articles. Thus many descriptions of bar iron, rolled or hammered, were enumerated; but as it was possible that descriptions of rolled or hammered iron might be imported other than those specially named, Congress added a provision for all other descriptions of rolled or hammered iron." The question in the case is not, are these forgings "rolled or hammered iron," but are they "rolled or hammered iron not otherwise provided for?"

Mr. Weeks clearly makes out his case.

THE strike movement has extended to the iron workers ~ Louis, and a number of mills closed on Wednesday, throwing out of employment some 2,500 men. The ground of dissatisfaction, which was discussed last Monday at a meeting of the mill owners and iron workers, is that the mill owners refuse to adopt any new scale of wages that at any future time shall be adopted by the Pittsburgh manufacturers. Were this conceded, the strikers would be willing to continue work at the present rate of wages. Thus the men voluntarily forego the wages that would satisfy them for the present, and this for the unlikely prospect, looking to the present and prospective condition of the iron trade. A potent consideration influencing the St. Louis iron manufacturers in resisting the demand is the fact that railroad freight rates from Pittsburgh west discriminate against St. Louis, a circumstance which renders the demanded concession the more unreasonable.

THE annual report of the Secretary of the American Iron and Steel Association says that prices were generally higher at the close of the year than at the beginning, although there were indications in December that a decreased demand and lower prices might soon be expected. These ndications have been verified. The demand for most iron and steel products has sensibly slackened, and prices have very generally sympathized with this decline. Steel rails especially have experienced a remarkable fall in price. At the middle of December they were quoted at $60 while the price at the end of the month was $58. At the middle of May orders were easily placed at $50 a decline of $10 in five months. Iron rails were quoted at $48 at the close of December, and in May they had fallen to $44. Pig iron fell about $1.50 per ton from December to May, except for best brands of No. 1 anthracite foundry. The prices of bar iron and rails have recently sympathized with the downward tendency. In December the price of bar iron at the stores in Philadelphia was 2.9 cents per pound, and at the middle of May it was 2.6 cents. The quoted price of nails at Pittsburgh in December was $3.30 per keg, and at the middle of May it was $3. The demand for all iron and steel products just now is not encouraging, heavy importations and other causes having exerted an unfavorable influence on the market. The present range of low prices is not, according to the report, to be regretted, as the enormous importations of iron and steel will thus be checked.

THE French Government has under consideration a new departure in telephony, which is to buy up the patent rights of the telephone in France. It is proposed to open stations in connection with the present telegraph offices, at which the public without becoming subscribers, may communicate with subscribers at a charge of half a franc (10 cents) for every five minutes.

THE Chief of the Bureau of Statistics reports that there was an excess of imports over exports during the month of April of $8,686,522. In April, 1881, there was an excess of exports of $11,706,001. For the ten months of the current fiscal year the excess of exports was $56,404,839, against an excess of $246,546,790 for the corresponding ten months of the preceding year. In April the excess of exports of gold was $1,754,625, and for the four months ended April 30 the excess of exports was $13,349,628. In April of last year there was an excess of imports of gold of $14,084,540, and in the four months ending with April the excess of imports was $24,350,314. For the ten months ended April 30, 1882, the excess of imports of gold was $13,169,166, and for the corresponding ten months of 1881 the excess was $92,708,310.

THE present strike in the iron trade does not include the Chicago iron works, which will continue operations, by direction of the Association, for two weeks.

## MANUFACTURES.

### TO MACHINISTS, MANUFACTURERS AND OTHERS.

THE publishers of THE TRADE REVIEW solicit items of information concerning manufacturing and other establishments in any part of the country, and all such items will be promptly inserted in these columns, free of charge. Facts are the only things needed; and all communications should be accompanied with the name of the contributor—not for publication—but as a guarantee of good faith.

Manufacturers, machinist and engineers are particularly requested to communicate any matters of interest relating to their specialties. No one need be deterred from sending any interesting facts in his own language, as all such contributions will be properly revised before sendin to press.

### OHIO INDUSTRIES.

THE Ohio Bottling Company has been incorporated at Canton; capital, $25,000.

THERE is no intention at present on the part of the Cleveland Rolling Mill Company to start any department.

THE Enterprise Glass Works at Ravenna have closed operations for a brief season, in order to reduce stock.

THE Monitor is working splendidly, turning out about 8 tons of iron daily. Their calcining oven for ore is a complete success.

THE Spiegel Furnace, owned and operated by the Brier Hill Iron and Coal Company, is turning out twenty tons of spiegel per day.

MONITOR is working splendidly, turning out about eight tons of choice iron daily. Their calcining oven for ore is a complete success.

THERE are two white ware potteries in Wellsville, one extensive terra cotta works, and a yellow and Rockingham ware pottery is in course of erection.

W. D. KELLY & SONS recently put their Grant Furnace, in Ironton, into blast. They have been repairing Centre Furnace, and will start it up next week.

THE works of the Union Glass Company at Martin's Ferry will be ready for operation about July 1. The dimensions of the main building are 76x34 feet, those of the factory building 127x55. They will employ about one hundred hands. Henry Welling is president of the company, and R. T. Howell, secretary and treasurer.

GRAY'S agency, Youngstown, reports: There is a somewhat better trade in foundry irons, but prices are weak, and it is difficult to place large lots without concession. Forge irons quiet. Car Wheel trade dull.

THE Brilliant Glass Company's Works at Brilliant, Jefferson county, lately rebuilt, is running full time and doing a good trade; they have plenty of orders on hand.

MORLEY & Co., Wellsville, are turning out some very handsome majolica ware, and the attention of the trade is called to the inducements they are prepared to offer in their lines.

GILL BROS. & Co., Steubenville, are laying the foundations of a new warehouse across the railroad opposite to the present one. This will give them ample and much needed storage room. Their business is fair.

MESSRS. Westlake & Co., Warren, shut down their rolling mill last week, and will not resume work until the difficulties in the iron business are definitely settled, and the laborers assent to the terms offered by their employers.

THE Ætna Iron and Nail Company, at Bridgeport, are building ten new building furnaces, which are nearly completed. They are also adding an 8-inch guide mill and two sheet mills, one 24-inch and one 20-inch. They expect to have all in running order by August 1.

SOME extraordinary heavy bars have been lately rolled at the muck train in No. 4, in Brown, Bonnel & Co.'s mill. The best weights were 500 and 550 lb. An apparatus for straightening rails is being erected in No. 2 mill that will make a great saving of labor.

THE Ætna Fire Kindler Company, Springfield, has been incorporated with a capital of $10,000; also the Hughes & Malls Agricultural Company, Hamilton, capital $50,000; and the Pioneer Cooperage Company, Cincinnati, capital $30,000.

THE stacks at the Hubbard Mill, Youngstown, are still standing idle, a monument to the folly of the owner, who could, if he was so disposed, furnish employment to a large number of skilled laborers and other employes.—*Youngstown Register.*

THE Liverpool Glass Manufacturing Company have erected a temporary machine shop, adjoining A. J. Boyce's foundry and machine works, East Liverpool, where they purpose manufacturing molds and other articles, pending the completion of the new glass works shortly.

THE following Ohio companies have been incorporated: The Centennial Company, of Cleveland, capital $50,000; the Gooch Freezer Company, of Cincinnati, capital $100,000; the Buckeye Brush Company, of Cleveland, capital $40,000; the Cleveland File Company, Cleveland, with a stock capital of $10,000; also, the Mansfield Bolt and Nut Company, Mansfield, with a stock capital of $30,000.

THE foundation for the building in which will be manufactured cold-polished shafting at the Valley Mill, Youngstown, is completed, and the erection of the building is in progress. New machinery furnished with the latest improvements, with an engine of seventy-five horse power, will be placed in the building. With everything running properly, the establishment will turn out 25 tons of shafting a day.

THE new glass company at East Liverpool is to be known as the Liverpool Glass Manufacturing Company, Limited. It is not a co-operative concern, as stated by some of the papers. The company own a lot, 500x300 feet. The glass house proper will be 80x80 feet, and they will erect a 14-pot furnace, patent bucket teaser. The entire frontage will extend 226 feet. They will have, besides all the machinery necessary for a first-class factory, also a complete outfit for a mold shop. They will make a full line of glass factory, also a complete outfit for a mold shop. They will have, besides all the machinery necessary for a first-class glass factory, also a complete outfit for a mold shop. They will make a full line of glass tableware, and will employ 200 men and boys. The motive power will be furnished by a 40-horse power steam engine. The works will, according to the present plans, be completed and in running order by August 10, 1882.—*Amer. Pottery and Glassware Reporter.*

THE nail factory of Brown, Bonnell & Co., Youngstown, is turning out 500 kegs of nails each week. In their several mills, mines and factories they employ 5,000 persons.

M. A. BRAG, from Connecticut, has purchased an interest in the Malleable Iron Works, Youngstown, and will be Superintendent. The works have been shut down seven weeks.

THE organization of the Wooster Stove Company has been completed. An addition to the shops will be built, 70x40 feet, with a foundry capacity of twenty moulders. It is expected to have the establishment running at full blast by the 1st of July, and fifty men will be employed.

M. DEAL & Co., the well-known manufacturers of grain-cleaning machinery, Bucyrus, are working up a good foreign demand for their California smutters and brush machines. Three of their machines were sent to Norway recently, and a prominent mill in Ireland has also adopted a full line of them.

BROWN, BONNELL & Co., Youngstown, shut their extensive works on the 1st inst. This stops four rolling mills, three coal banks, three blast furnaces and coke works. Five thousand persons are thrown out of employment. The reason of the closing is that the firm refused to sign the scale of the Amalgamated Association.

PALMERS & DEMOOY, iron foundry, 96 Merwin, corner Leonard street, Cleveland, the newly established firm, who make light gray castings a specialty, employ 15 men, and in a few days will place on more hands. Trade has opened good. Mr. De Mooy was with Messrs. Taylor & Boggs fifteen years, and is a first-class practical mechanic.

THE Viaduct Foundry Company, 409 to 421 Detroit street, (new numbers,) Cleveland, who are manufacturers of machinery castings, and make light castings a specialty, employ 50 hands. They have a large local trade, which is most active at the present time; some shipments are made by them to Michigan and surrounding States. The company was established in 1880, and such has been the growth of their business that they propose enlarging their business in a short time.

ONE of the best carriage bows in the market, writes our Elyria correspondent, is that just introduced by the Elyria Carriage Hardware Company, the well known manufacturers of improved, flexible carriage bows, with patent attachment for fastening. This bow they have perfected in the past season; and its merits are so easily discernible that it is likely to have a general adoption. On an average ten hands are employed at the works. The members of the company are W. D. Mead, W. S. Wallace, and E. S. Carter.

THE Steubenville Flint Glass Bottle Company are at work on their new factory at North and Seventh streets, Steubenville. The main works will be 100x60 feet, and the packing house 40x65. There will be one ten pot furnace, patent bucket teaser. They will have a complete outfit of all necessary plant and machinery. They propose to manufacture bottles and flasks of all kinds, prescription vials, together with mustard, catsup and pickle bottles. There will be employment furnished to one hundred men and boys at this works.

MR. O. W. BAYLEY, representative of the Dayton Gauge Company, has been in Cleveland for the past few days looking after the trade. He reports the business of the company to have been very good the past season and prospects satisfactory. The leading railroads and steamboats of the country are adopting their gauges, as are also the Rogers Locomotive Works of Paterson, N. J. The company carries on hand a large assortment of all sizes of gauges, namely, the direct acting duplex gauge, the hydraulic gauge, and also the Ashcroft or Bourbon gauge. Notwithstanding the great depression in the price of steam gauges, the company have continued to make their gauges up to the standard mark, considering them, not only in their own judgment, but from the expressed opinion of our leading mechanics and engineers, as equal to any in the market. They give a full guarantee on all gauges manufactured by them, and are prepared at all times to fill orders for gauges of any description.

OUR Fremont correspondent writes: D. June & Co., manufacturers of the fire-proof champion agricultural engine, saw and grist mill engines, have brought out a new fire-proof traction engine, the result of close practical study of the requirements of the farm and plantation in this line. No sparks can escape from it. The engine, which is of first-class workmanship, is admirably designed, both for strength and use. The firm, which was established in 1852, has a large and flourishing business and employs sixty-five hands.——The Fremont Harvester Company, manufacturers of Hubbard & Meadow Lark Reapers and Mowers, employ eighty hands. Last season was an excellent one with them, and they look for a still larger trade. They are about completing a new binder machine, which they consider the best ever invented. It will be placed on the market some time during the coming season. This firm is one of the solid institutions of Fremont. The directors are William B. Sheldon, F. S. White, James W. Wilson, R. P. Buckland, and L. Q. Rawson. Mr. Sheldon is President, Mr. J. M. Smith Secretary and Treasurer, and Mr. J. M. Bell, Superintendent of sales.

ACCORDING to the report of the census bureau, Cleveland stands thirteenth in point of production among the leading manufacturing cities of the United States. The figures were gathered in 1880, however, and the increase in this city since that time has no doubt been sufficient to place her still higher in the ranks. She had at that time 1,033 establishments, with a capital of $18,134,789, and consuming $30,850,977 worth of material annually, the product amounting to $47,352,208. Persons employed, 21,499, of whom 17,751 were males, 2,363 females and 1,385 children. The annual wages amounted to $8,377,081. The principal industry is the manufacture of iron and steel, in which she stands third, the $2,839,042 invested producing $9,435,432 in ten establishments employing 3,000 men and boys, to whom $1,960,237 in wages were paid. Beside these are 29 establishments manufacturing bolts, nuts, screws, washers, rivets, castings, ornamental iron work, etc., which swell the number of employes to 5,100, capital $1,815,338 and product $4,183,836.——Next in point of importance is the manufacture of men's clothing, $1,086,600 capital being divided among 73 establishments, employing 885 men and 1,172 women, to whom are paid wages amounting to $634,419 annually, the product amounting to $2,687,409.——Twelve beef and pork-packing establishments, with an invested capital of $447,000, produce annually $5,427,938. Seven cities precede Cleveland in this industry.——Six sewing machine establishments, with $148,500 capital, produce $1,202,925 worth of machines, and employ 750 men. Cleveland leads the list in this product.——Ten paint manufactories, with an invested capital of $423,500, employ 250 hands whose wages are $113,214, and product valued at $1,202,480.——Five lubricating oil refineries with $655,850 capital have an annual product of $1,163,714.——Thirty-seven machine shops, combined capital $798,200, employing 1,000 hands, produce $1,135,560 annually.——Six flouring and grist mills turned out a product of $1,115,428 on a capital of $120,000.——Four bridge works employ 600 hands on a capital of $347,000 with a product of $925,063.——Eleven printing and publishing establishments employ 350 hands on a capital of $963,300; wages, $258,590; product, $666,500.——Of the industries whose products were over $300,000 per year were: Boots and shoes, 103 manufactories, $227,045 capital, $455,536 product; 45 bakeries, capital $110,303, product $452,823; 4 car shops, capital $144,500, production, $661,000; 11 cooper shops, $42,572 capital, $474,050 product; 6 drug and chemical works, $563,000 capital, $557,500 product; 11 marble and stone yards, capital $188,600, product $412,850; 15 sash, door and blind factories, capital $406,314, product $857,687; 15 ship-yards, capital $162,100, employing 400 men; 60 tin, copper and sheet iron ware shops, capital $141,650, production $447,811; 4 varnish works, capital $432,500, product $691,245; 25 wagon shops, capital $165,400, product $335,084; 4 malt houses, capital $260,000, product $333,452; 68 cigar and tobacco manufactories, capital $106,950, product $366,412, and employing 400 men.

OUR Sandusky correspondent writes: J. P. Merriam, M. E., 820 Water street, manufacturer's agent and contractor, millwright and draftsman, and who keeps in stock all descriptions of machinery, new and second-hand, employs ten hands. He has a general shipping trade, and reports past business as most satisfactory and prospects good. His new Favorite Circular Saw Mill is largely ordered by mill-owners and lumbermen, as free from all known drawbacks and embodying valuable improvements and conveniences. This mill, which I trust you will some day illustrate, does accurate and superior work, and can be handled alone with the same ease that two persons will, with the usual make of mills, and do superior work; in short, just like ordinary plantation or pony mills. The saw frame is a strong, solid iron casting of a neat design, carrying fifty-four to sixty-six in. saws. The gauge roll makes a positive stop for setting, and makes every board the same thickness accurately when desired. When the pawls are tripped, the hand wheel close by, runs back the set beam and uprights quickly, from either side of carriage. Extension arbors are made for all these mills, so as to give "ample room" between main belt and the carriage.

MISSOURI.

THE Missouri Car and Foundry Company, St. Louis, have recently finished fifty cars for the St. Louis Refrigerating Car Company, and are now building twenty-five more for the same company These seventy-five cars will be used by the Anheuser-Busch Brewing Association in the transportation of their beer. The company are also building 200 dump cars of extraordinary length, each car being 34 feet long, for the Louisville & Nashville railroad; and 200 box cars for the Blue Line, and are doing extensive repairing for a number of other railroads.

THE French Window Glass Manufacturing Co., of St. Louis, Missouri, are running eight pots, work fifty men, and use from twelve to fifteen tons of sand per week. The annual production of glass is 30,000 boxes of fifty feet each and the wages paid employes amounts to $55,000 per year.

THE Helmbacher Forge and Rolling Mills, St. Louis, have increased their force by the addition of some thirty hands within the past two weeks and are running full in all of their departments.

THE St. Louis Wooden Ware works have put in a new machine for cutting wooden wrappers, the capacity of which is 100,000 wrappers per day. The wrappers are used for covering beer bottles, C. Conrad alone using 25,000 per day. The firm have also put in a new machine for tightening the bottoms of buckets.

THE Moran Nut and Bolt Manufacturing Co., St. Louis, is putting in two new bolt headers with a capacity of 3,000 each per day, making seven headers with a total capacity of 21,000 per day.

INDIANA.

THE roof is now being placed in position on the main building of the new steel rail mill of the Indianapolis Rolling Mill Company, and the machinery is arriving and being placed in position. They hope to be in running order by August 1.

THE Marshall Sugar Refining Company is consuming 2,000 bushels of corn daily, and is busily employed in enlarging its works to double its present capacity.

WISCONSIN.

A LOCAL paper gives the average number of hands employed in Winona, Wis., in twenty-two establishments as 1735, and the aggregate average pay roll is $72,400.

KENTUCKY.

LOUISVILLE is the largest producer of plows of any city in the world. There are seven factories, with a capital of $1,130,100. Over 100,000 plows were made in 1881.

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CURE FOR LEAD POISONING.—In some of the large establishments of France, the best antidote for lead poisoning was found to be a lemonade made of weak sulphuric acid, but after a while the workmen became disgusted with the taste and refused to drink it. It was observed that two workmen in one of the factories were entirely exempt from lead colic, and upon inquiry it transpired that they made free use of milk. The director of the works at once ordered enough milk every morning and evening for all of the workmen, and from that time all symptoms of lead poisoning disappeared. The suggestion is worthy of attention on the part of all persons who are exposed to the poisonous action of lead, to make free use of milk. It is at once an agreeable and easily attainable remedy. The same remedy has been used with equal success by many American painters. It should be universally known and adopted, as few things are more dangerous or insidious than lead poisoning.

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When writing to advertisers mention this paper

## The Causes of Wants or Areas of Barren Ground IN THE COAL BEDS OF OHIO.

BY ANDREW ROY.

MINING INSPECTOR OF THE STATE OF OHIO.

[Read before the Ohio Institute of Mining Engineers —Special Report.]

[Concluded.]

Some of the workable beds of coal lying between Nos. 1 and 6 are opened and worked to a considerable extent, and like the lower coal, these beds are often wanting where they are due—they thin down and disappear altogether in the hillsides of the mines exactly as the lower coal disappears. No. 6, the great vein of the Hocking Valley, the Steubenville shaft and the Salineville coal is, as I have said, a remarkably steady coal, and by reason of its superior quality and extra height is more extensively mined than any other seam in Ohio. There are, however, extended intervals of barren ground in this coal seam upon which the coal vegetation never grew. These wants or barren areas are always met in what must have constituted the high lands of the old coal plain. The same conditions, met in the long, narrow and serpentine swamps of the lower or Mahoning Valley coal, are repeated, though on a greatly larger scale, in the great vein region of the State.

The mines of Salineville offer the best field for studying this subject, for there the basins are sometimes as narrow as in the Mahoning Valley. The coal at Salineville, as in the Mahoning Valley, begins to lose height on the sides of a steep hill, and finally thins out and disappears altogether, reappearing in another trough miles distant. In the great vein region of the Hocking Valley the coal is stretched over a vast area of unbroken ground. It has, however, some wants; in one of the mines at Corning a hill has been encountered, the coal thinned down and disappeared, and beyond the basin the coal driller could find no coal by boring for a mile or more.

At Coshocton the hills in the mines sometimes rise to a height of 20 feet, the coal gradually thinning down in its ascent, losing height from the bottom of the bed, though it nowhere, so far as I have observed, disappears altogether in any of the mines of that district, but dips over into adjoining basins and recovers its lost height. As the hills are not often cut down the opportunity for judging as to whether the strata immediately underlying the coal conforms to the pitch of the coal is not as good as in the Mahoning Valley mines. But the fact that the coal gradually thins down in ascending the hils and mainly loses height from the bottom of the seams is conclusive proof that these undulations existed before the coal was deposited and are not due to an upheaving and folding of the strata after the coal field was built up. In one of the mines of the Glasgow, Port Washington Co., in Tuscarawas County, the floor is blasted up to a depth of 8 or 10 feet in one part of the main gangway. Here the coal was found dipping at an angle of 15 degrees while the strata below ran level—a repetition of the conditions met in every mine in the Mahoning Valley.

Other wants in coal beds are frequently met where the coal vegetation after having been deposited was subsequently removed by denuding forces, by currents of water in rapid motion sweeping over the coal marsh and cutting away part or the whole of the coal vegetation and leaving a deposition of sand over the denuded area. These wants, as I have stated in the opening paragraph of this paper, are called horsebacks; and they are readily distinguished from the wants or intervals of barren ground which I have described.

It is my opinion, formed from observation, that a number if not all of the coals of the lower coal measures of the State will be found resting in swamps, or troughs, or basins, which were once river beds or lakes or arms of the sea, and that great stretches of barren ground will be encountered in mining. The Pittsburgh coal, the lowest bed of the upper measures, is very extensively mined around Bellaire and Pomeroy, and it is remarkable for its continuity and its freedom from faults of all kinds. A few clay veins are occasionally met, but seldom any horsebacks, except an occasional saddle like rolls in the floor of the mine which rise up into the coal for a foot or eighteen inches resembling the shape of a horse back. No barren areas or elevated plains where the coal vegetation never flourished are met. The coal is found wherever it is due, stretched out in an unbroken sheet. It is highly probable that all the coal beds of the upper measure will be found occupying more extended areas than those of the lower series.

The subject of this paper is by no means exhausted, and I shall refer to it again at some future meeting of the Institute. The views I have set forth are, as I am aware, peculiar, but I am satisfied they will be found to be in the main correct, so far as the coal beds of Ohio, at present opened and worked are concerned.

# PRACTICAL MECHANICS.

## Foundry Practice.

There is probably no department in a general engineering establishment less generally known, or whose operations would better repay a little careful study, than the foundry. The reasons for this are not far to seek. The avocation of a metal founder is by no means one of the cleanest, while some branches of it are rather repugnant to persons of an excessively refined taste, and many who descant pretty loudly on the "dignity of labor" and the "honesty of dirt" would hesitate a little before venturing to explore the mysteries of "loam" and "lant." It is seldom, for instance, that apprentices who are professing to go through the shops spend any of their time in the foundry, mainly, we suppose, because its operations are thought to be in some way degrading. The art of iron founding, however, is by no means of the simple "mud-pie-making" character so often thought, and were its operations a little better understood, the cost of castings would, in many cases, be materially diminished, since a very slight modification of the design, not involving any alteration of principle, would often very much simplify the operation of moulding. The impression that the art is extremely simple is at times somewhat shaken when a casting rather more expensive than usual turns out a "waster." the abortion of perhaps a week or a fortnight's labor. The general ignoronce of the employer, however, makes him an easy prey to the excuses that are tendered on such occasions, and he contents, himself, very often, with the reflection that the loss is the result of accident and cannot be helped, and that the operations of the foundry, although not involving much skill, are still attended with a considerable amount of risk. Without contending that with such a fragile material as sand it is possible to always insure the safety of a mould, still we do think that "wasters" are very often put down as the result of accident which do not rightly fall under that head, as we understand the meaning of the word.

The most striking illustration, however, of the neglect in which moulding has lain is seen in the general absence of labor-saving appliances, and in the run of ordinary jobbing shops articles are moulded in much the same primitive fashion they were a century ago. There is one exception, viz., spur-driving and pinion wheels, which are now almost exclusively made with the aid of a radial moulding machine and moulded one tooth at a time. The advantages of this plan—enabling as it does any size of driving wheel to be expeditiously and accurately made without involving any further expense in the matter of pattern making than is required for the cutting of a block containing two teeth—are so obvious that few establishments are considered to possess even a decent complement of tools unless they are provided with a wheel-moulding machine. The introduction of this machine further enables very modest firms to compete in a branch which was formerly the specialty of a few firms who happened to possess a large stock of wheel patterns. When only one casting is required of a pattern, there is, perhaps, not much room for improvement in the ordinary way in which they are made. But there are many little articles in most shops of which a sufficient number are required to make it well worth the while to expend a little capital in labor-saving appliances, whereby the cost of production would be diminished and the output at the same time increased, with the additional advantage of being independent of skilled labor. We have, at times, been struck with the painfully slow method in which castings have been produced, articles being made one at a time which ought to have been turned out by dozens.

It is, of course, in machine making establishments where hundreds and even thousands of one particular article are required, that the best opportunity presents itself for the introduction of labor-saving appliances. Some advance has undoubtedly taken place during recent years, and advertisements for foundry foremen possessing a knowledge of plate and plaster moulding are much more frequent now than they were a few years ago. There still exists, however, plenty of room for improvement. The utmost that has been done in many cases has been to adopt a few of the simpler patterns to "plate" or "plaster," while even this modicum of improvement is, at times, attended with a considerable degree of disappointment from simple want of adaptation of means to end, articles being put on "plate" which were better adapted to "plaster" moulding, and others again adapted to "plaster" which ought not rightly to have been moulded on either plan.

When extreme accuracy is not of such vital importance, or the castings are not inconveniently large, and the mould can be readily made with a plain flat joint, "plate moulding" may perhaps be adopted with advantage.

On the other hand, "plaster moulding" is best suited to the cases which require the joint of the mould to be somewhat irregular and uneven. Like "plate moulding," it has the disadvantage of being attended with a certain amount of play, which is unavoidable in drawing the patterns.

When accuracy of casting is required, what is known as "machine moulding' is par excellence the best method to adopt. The great advantage is its adaptability to either the most small and delicate castings or those whose size practically forbids the adoption of either of the two previous methods. It is also applicable to articles which, on account of the difficulty in drawing from the sand, it would be impossible to mould either with the aid of plate or plaster. To those unfamiliar with the capabilities of machine moulding, the ease and rapidity with which fine-toothed wheels, screws, worm wheels, and a host of other similar articles, may be made, is astonishing, and many people will doubtlass be somewhat incredulous when we say that we have seen fine-toothed wheels, about 9 inches in diameter, cast for 16c. a dozen; cast iron screws, about 2 inches in diameter and 3 inches in length, made at four for 2c., and at this rate of pay it is quite possible for an unskilled youth of 18 or 19, after a few weeks' practice, to earn between $5 and $6 a week. In giving these figures we are not drawing upon our imagination, but we are speaking from actual experience.

The capabilities of machine moulding, its accuracy, and its adaptability to even the most intricate castings, are known to very few firms, and there are one or two establishments we could name whose commercial prosperity and success have been due in a very great measure to the care and attention that have been bestowed on the development of the foundry, whereby the cost of production of the castings has been reduced, in many cases, to one-tenth of that formerly entailed with hand labor, while greater accuracy has been assured in the castings. This benefit has been at the same time attended with an enormous increase in the producing capacity of the foundry, coupled with the further advantage of being independent of skilled labor. We intend now and then giving some articles on these and other points in foundry practice, and we have no doubt that, with so little published on the subject, such articles will be welcomed by many of our readers.

## Iron Making.

The processes for the reduction of iron from its ores have been greatly improved of late years, so that we may now obtain a very good quality of metal from ores which contain considerable quantities of sulphur and phosphorus. By the process in common use the ores are mixed with coal, limestone, or other suitable material, charged into a blast furnace, and the iron cast into pigs. Lately, however, the so-called "direct method" of reduction has been coming into favor, and from the latest experiments it would seem that the removal of the most troublesome impurities is easily accomplished by this method. In outline the new process is conducted as follows: The ore is ground to a coarse powder and intimately mixed with lime, clay and carbon. This mixture is then molded into the form of hollow cylinders, about fifteen inches high by eight inches in diameter, the walls being about three inches in thickness. These cylinders are then placed quite close together upon the hearth of a large reverberatory furnace, and a high heat is immediately applied. The object of molding the cylinders is to enable the heat to rapidly act upon the ore. Under these circumstances, the carbon of the mixture reduces the iron of the ore to a metallic state, but the metal is not fused as in the blast furnace. It remains in the form of the original cylinder, mixed with a slag that contains most of the impurities, and is known as spongy iron.

It is well known, however, that the flame of a reverberatory furnace is naturally an oxidizing flame, and tends to burn up any iron that may be exposed to its action, and the spongy iron is in a condition peculiarly adapted to rapid oxidation. This difficulty has been ingeniously overcome by careful attention to the nature of the slag, which in several ways plays an important role in this process. The slag must be a non-flowing slag, so that it will not run away from the iron, but remain as a covering to protect it from the oxidizing flame. It must also be a basic slag, for then it removes the phosphorus and sulphur. In the course of one and a half or two hours the reduction is complete, and the cylinders of spongy iron are ready for the mechanical operations of squeezing to remove the slag and rolling into bars.

The great value of the process may be more fully appreciated when it is stated that puddle-cinder, which contains an average of over 50 per cent. of iron, and which, owing to the large amount of phosphorus and other impurities is practically a waste product, may be economically worked by this process and converted into a good merchantable iron at a single heat. About one ton of muck bar may be obtained from three tons of puddle cinder, and the percentage of phosphorus reduced from 2 per cent. in the cinder to 0.4 in the metal. It has taken a long time to bring the direct process to its present state of perfection, but now that its ad-

vantages are so well known, we may expect it to supersede all others.

In the old process the ores sometimes required a preliminary roasting, then the metal had to be cast into pigs, then remelted and puddled for the removal of impurities before it was ready to be rolled into bars, and during the puddling a considerable quantity of the metal is oxidized and passes into the puddle cinder above mentioned. By the new process the preliminary roasting is never necessary and the bar-metal is produced by a single heat of not more than two hours' duration. It can readily be seen, therefore, that there is a considerable saving of fuel and labor in the direct process. By the use of ores quite free from phosphorus an excellent open.hearth steel may be produced by the direct fusion of the spongy iron without mechanical removal of the slag. Practical tests of the iron produced show that it will make the finest grade of crucible steel.

## Mining Legislation.

A Paper read before the Nelsonville meeting of the Ohio Institute of Mining Engineers, May 11, 1882.

BY THOMAS MIDDLETON.

[Specially reported for the Trade Review and Western Machinist.]

In England as early as 1769 a law was passed dealing with mines. The act had simply reference to the damaging or destroying hoisting and pumping engines, and those that were found guilty of the offence were subjected to transportation. Mining legislation, from the year 1769 until 1800, was altogether one-sided. There was protection for the master or owner, but very little for the miner. In the year 1817 an Act was passed that miners should receive every part of their wages in good and lawful money, but not a thing was said or done for the deplorable state of ventilation. It was not till the Felling disaster in Durham county, when ninety-two lives were sacrificed by an explosion in the year 1812 that the public were aroused, and an association formed in Sunderland to investigate and try to avert such dreadful calamities. It had up to this time been the practice to take no notice of accidents in mines. The Sunderland association demanded coroner's inquests held upon all killed in mines. Also a report was made at that time on the different modes of ventilation by Mr. Buddles, the eminent coal viewer of that day. He said that the ordinary accidents in mines occasion more calamity than explosions, and we can say the same thing to-day. In 1835 a committee of the House of Commons was appointed to examine the various laws and regulations under which mining was prosecuted. In 1839 the South Shields Committee was obtained and extended over three years. It gave valuable information as to mining accidents and their causes. In 1844 the Haswell explosion occurred, when ninety-five men and boys were lost. This misfortune caused the appointment of Messrs. Lyall and Faraday to examine and report on the explosion. These gentlemen suggested a better education among the mining classes and more effective ventilation. In 1849 Messrs. Blackwell and Philips were appointed to examine the mines of England and Wales. They reported that the ventilation and working of coal mines was defective, and to prevent such disastrous explosions recommended that a systematic inspection of mines should be under the control of the Government, and this was the beginning of coal mine inspection and progress of mining legislation, for in 1850 a bill was introduced by Lord Carlisle and became a law. We see by the reports of each and every committee that the the ventilation and working of mines as a general thing was defective, and not until explosions had destroyed hundreds of lives, could the British legislature be made to act upon it. By these recurring accidents the mine Regulation and Inspection Bill of 1860 was introduced. Although this bill was an improvement on all previous ones, it would seem that quite a change had come over the spirit of the legislature in looking to the interest of having effective ventilation and management of mines. For 1872 an act was passed for the management of mines which practically supersedes previous enactments. Every coal mine is to be controlled by a manager who has passed an examination and holds a certificate of his competency. After many years of bitter opposition against mining legislation in Great Britain, coal owners now take an active part in framing the laws to govern and regulate mines, for they find it to be to their interest to have good and efficient managers.

In the General Assembly of Ohio an act passed creating a mining commission, (of which our Hon. President was one of three), to visit the leading coal mines in the State and inspect their condition and manner of working the same, and the ventilation. The report was received in 1872, and it showed that the ventilation of our coal was seriously defective, and anything else but in a healthy condition. After the report was received petitions from the miners by the hundred were sent to the legislature asking for better ventilation and inspection of mines. In 1874 an act was passed to regulate mines and mining, and with it an inspector of mines appointed. In 1881 an act was passed for the appointment of an Assistant Inspector, also, an amendment to the mining law. Now, let us see what inspection has done for Ohio by taking the number of fatal accidents to the number of tons of coal mined. I shall only call your attention to the years 1874 and 1881. In the former the number was 34, being one death to every 108,919 tons mined; in the latter the number was 29, which equalled one death for 283,621 tons, which shows very pleasing and good results. I believe reports show in Great Britain that nearly four times more accidents result from falls of roof and coal than resulting from explosions. Accidents from the roof or coal are, as a general thing, under the control of the miners themselves. But bad ventilation and grossly defective modes of working the coal is the fault of the underground boss or superintendent. We have seen by the reports of scientific and practical men in Great Britain that effective underground management is the best safe guard against accident. Meanwhile terrible explosions continue, which proves the necessity for more careful management and better ventilation. If they are not up to the standard in mining knowledge in Great Britain after so many years of practical and scientific knowledge and study, what must be the state of things here? We have known at least two underground bosses who could neither read nor write, and had no more idea about the principles of ventilation than a digger Indian has about navigation. While explosions occur every now and again in Great Britain, we are fully convinced, had not the act been passed for inspection and the examination of colliery managers as to their competency, that the loss of life and limb by explosions and ordinary casualties in mines would have been at the least two-fold to-day, and valuable deep coal seems would have never been touched that are worked. We believe it to the very best interest of both the coal operator and workmen that the manager or underground boss should understand the principles of ventilation and the best methods of working a mine. By practical and systematic working it would do away with the bad condition of mines, and the largest per centage of coal per acre would be got at the lowest cost. By understanding the general principles of ventilation we are enabled to produce the greatest quantity of air and properly distribute it to the different parts in the mine. With good air and a sufficient quantity the miner is able to produce more coal, day laborers, drivers and ponies to do more work at the least loss of power, which is a like benefit to the operator and miner. In mining legislation we must not be one-sided. We must not increase the needless cost of coal where it can posibly be avoided, nor inflict too severe penalties on owner and manager, and let the miner go scott free for criminal carelessness. We desire to make Ohio the leading coal producing State in the Union, and increase her wealth by the development of her great mineral resources, and by good and efficient management of her mines.

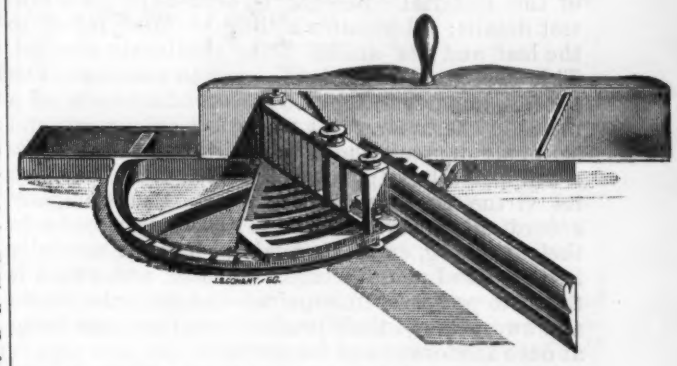
What mining legislation and mining institutes in Great Britain have done towards making able and competent underground managers and mining engineers, so may the mining legislation and infant Mining Institute of Ohio.

DETROIT & MACKINAW ROUTE.—Now that so many are intent on planning summer excursions, we do a service by calling attention to the Mackinaw route. The Detroit and Cleveland Steam Navigation Company has put on the route the platial iron steamer City of Cleveland, which besides affording luxurious accommodation has great speed. The route cannot be equalled for attractiveness. The attractions include views of the Detroit river, with its famous Belle Isle City Park, Lake St. Clair, with the costly Government canal, the island-studded St. Clair river, St. Clair mineral springs, and the great Oakland House, Port Huron, Fort Gratiot, Sand Beach (Harbor of Refuge), the lumbering section of Alpena and Cheboygan, and the Island and Fort of Mackinaw, reserved by the United States Government as a National Park. The dinner table of the "Cleveland" is supplied with all descriptions of game. Steamer connections may be made en route for visiting other parts of the Northwest.

TO MAKE MIRROR LIKE DESIGNS ON GLASS.—The following is an ingenious method to this end, devised by Leclerc. The glass, having been silvered by the chemical process, is coated with a thin and uniform layer of sensitive bitumen, and this is exposed under a transparency. The next step is to wash away the unaltered bitumen with oil of turpentine, so as to leave the bituminous design on the silvered glass. The application of moderately strong nitric acid removes the silver, excepting where it has been protected by the bitumen, so that the metallic design shows like a mirror from the reverse side of the glass. The plate may be backed by paint or any other suitable material.

## THE LANGDON MITRE BOX COMPANY.

MILLERS' FALLS, MASS.



The manufacture of the Langdon mitre boxes was commenced by the above company in the beginning of 1872. Thousands of them are now in use, giving universal satisfaction. No mitre box can long retain the confidence of the public unless it does perfect work. In order to do this all parts of the mitre box and saw must be thoroughly fitted and adapted to each other. None of their boxes are allowed to leave the factory until they have been adjusted and tested by competent and experienced mechanics. Ordinarily, although saws are ordered of specific guage, there is considerable variation, often making it necessary to try an entire package of saws before finding the one needed to make a perfect fit in the guides—which have to be prepared with files made expressly for the work, and which not one mechanic in a thousand either has or can procure. This will not be found to be the case with the saws of this company. The angles of the New Langdon are positive, same as the Langdon, and in addition are easily adjusted to any possible angle desired.

## THE GLOBE TOBACCO COMPANY.

DETROIT, MICH.

Prominent among the leading tobacco manufacturers of this continent is the Globe Tobacco Company, one of the most solid firms of Detroit, Michigan, and which is famed far and wide for the unexcelled, and in many respects unapproached character of its products. This company employs 200 hands in their Detroit factory and 50 hands in their establishment at Windsor, Ontario, and produce daily from 4,000 to 5,000 pounds. The brick factory at Detroit is on an imposing scale, four stories in height, and all the experience gained in internal arrangements of American and European tobacco manufactories has been turned to account with the view of facilitating and perfecting operations. The Company has been established 11 years and ships all over the Union, having a large export trade besides, which extends to Canada and Great Britain. So far as material is concerned, a large portion of their success as manufacturers is due to the knowledge at their command in making the best selections of leaf suitable for their special makes, and to the close scrutiny that each leaf undergoes at their factory. As we need hardly remark, however, the world wide fame they have achieved lies in the skill with which the leaf is manipulated, and to the perfection of their processes, aided by superb machinery, all in short that inventive mechanical skill can contribute to the results. Two important points attesting the value of their tobaccos are the preservation of the native flavor—the essential properties of the leaf being unimpaired—and the uniformity of the products. The want of uniformity is the great failing in the goods even of eminent manufacturers. The Globe Tobacco Co. brings an amount of care, science and skill to bear on their manufacture which excludes chance results. Their Gold Flake cut-plug must be particularly mentioned for its sweetness, delicacy and other desirable qualities as a smoking tobacco, made of the finest and sweetest bright old Virginia stock. Its qualities afford all the enjoyment possible to the imbibers of the aroma of 'the fragrant weed,' and have secured for it a wide preference among the gentry of Great Britain, as well as rendering it a general favorite in this country. The Gold Flake cigarettes rank among leading brands in the market; never did Cuban lady or Spanish hidalgo indulge in more luscious whiffs than these afford. In the production of the Globe fine cut, each leaf is separated from the bundle and critically examined. Equally excellent in its line is the Globe chewing tobacco, made of selections from the finest Kentucky leaf.

An inspection of the Company's Detroit factory

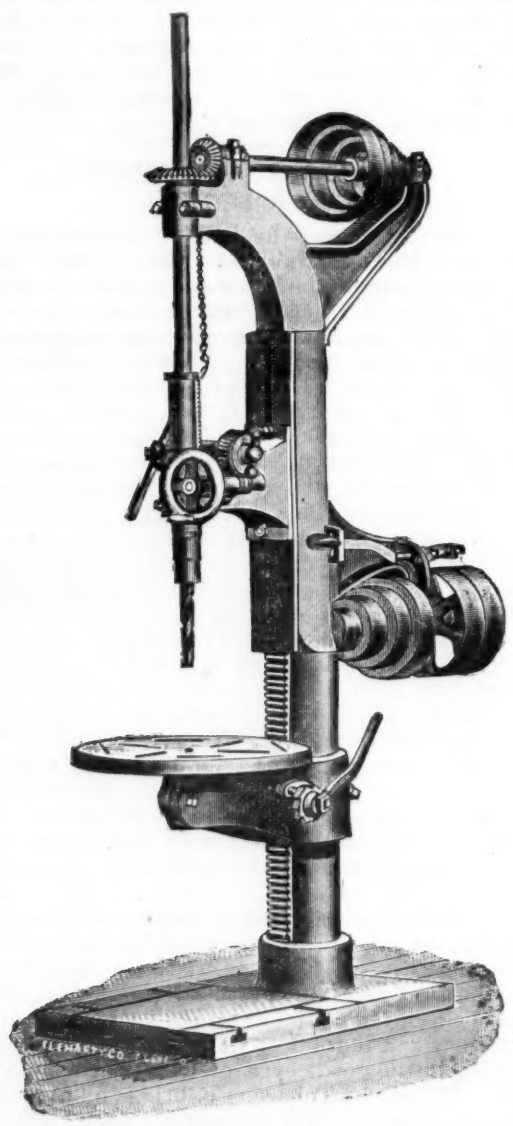
shows how careful throughout is the handling of the material. Science is evident in the minutest details; all possible soiling or other injury to the leaf and its aroma being studiously avoided. This care and skill extends even to packing. The tin foil imparts to tobacco a secondary taste of a metallic character, fatal to perfect enjoyment, and seriously depreciating it, whilst, if paper be used as a wrapper, a large portion of the fragrance, in which its virtue consists, is absorbed. The Company accordingly provide against these drawbacks in their packing, employing glass barrels, specially invented and manufactured for them, and which is found to preserve unimpaired the delicate aroma and sweetness of their productions, the glass being at once inodorous and impervious.

The testimonials submitted to us, on our inspection of the factory, from leading houses in the trade, abroad and at home, as well as eminent judges of the leaf, testimonials supplied without solicitation, are in themselves sufficiently decisive of the merits of the company's goods.

## UPRIGHT DRILLS.

EAGLE MACHINE WORKS, CLEVELAND.

The upright drills of the Eagle Machine Works, 23 Columbus street, Cleveland, have secured a well merited reputation in machine shops. The works have been established four years and have all along kept in the van in the making of drills. Those that are now being placed on the market, and which we illustrate, are of entirely new patterns



and have the latest and best attachments. Of first class style and perfect workmanship, the following points about them are worthy of attention: They have quick return feed, steel spindles, counterbalanced by weight inside of column; adjustable revolving arm, raised and lowered by rack and pinion; and table turns in arm, and when swung aside the bed plate may be used for a drilling table, the surface being at right angles with the spindle. The 22-inch has a column 6 inches in diameter and 6½ inches high, swings 22 inches, table 22 inches in diameter, and from table to end of spindle 33 inches; from base to end of spindle 45 inches; spindle 1 5-16 inches in diameter; bevel gears run two to one; cone pulleys, three changes, 4½, 6½, 8½ inches in diameter; loose and tight pulley; all for 2½ inch belt. The weight 1,000 pounds and price $105. Other desirable makes are respectively 26 and 28 inch, the former weighing 1,450 pounds and the latter 1,600. We have called attention to these drills on account of their excellent working properties. Each one sent out is guaranteed to afford satisfaction. The works employ 30 hands.

The double surface Feed Grinder, here manufactured, which was patented in March of last year, is an excellent device. It allows of the grinding of feed for stock and of meal and Graham flour for home use. We need not enlarge on the value of grinding of feed for stock; without it, the feed fails to affords the full nourishment of which it is capable. In this machine the revolving grinding burrs are held against the stationary burr by a nut on the shaft with which they revolve, which can be tightened or loosened, to grind fine or coarse. This arrangement does away with all the friction resulting from using a single pair of burrs, held together by a set screw, as the pressure resulting from the grinding between one of the revolving burrs and one face of the stationary burr, exactly counterbalances the pressure between the other revolving burr and the other face of the stationary burr, and there is no friction caused by holding the two revolving burrs against the stationary burr, because they revolve with the shaft that holds them together. There is no danger of clogging. The Feed grinder can be run with a single horse if steam power is not available, and each set of burrs, (which are replaced at a nominal price,) are guaranteed to grind 20,000 bushels.

## A New Steel Process.

Among the various attempts which have been made to improve on the Bessemer process, not the least noteworthy was the idea of using a fixed converter. Such a converter would permit the slag to be run off at an early stage in the blow, by which many advantages might be gained. Hitherto it has been found impossible to prevent the metal from escaping through the tuyeres. A patent has been taken out by Mr. Griffiths which promises to get over this difficulty. A trial took place last month at the works of Messrs. Nurse & Redbrook, of Monmouth, with a small low pressure fixed upright converter capable of holding about one ton, in the presence of some of the leading iron and tin plate manufacturers of South Wales and Staffordshire. Blows were made with a maximum blast pressure of 4½ lb. per square inch, each blow taking only an average of twenty minutes. The yields were good, and the steel produced appears to be of excellent quality, soft and ductile. We have not yet tested its tensile strength, but this we hope to do in a few days. Some of the steel was worked and welded in the presence of those present. We may mention that previous to this trial some twenty blows had been made, the steel of which had all been worked into bars, sheets, and tin plates. No spiegeleisen has been used, the only addition being a little over 1 per cent of ferro-manganese. The advantages claimed by the patentee for the process are its simplicity and small cost of plant, and that no skilled labor is required to handle it. It can be worked by an ordinary blowing engine which will give a maximum pillar of 5 lb. per square inch of blast. A two ton converter working ten hours per day ought to make 120 tons of soft steel per week, thus placing a steel-making plant in the hands of small manufacturers. These converters can, it is stated, be increased in capacity up to any size, and worked in duplicate to any extent. An important point in this converter is that it can be worked with four or six tuyeres fixed horizontally. By a simple mechanical arrangement, a stopper or plug, in each tuyere is actuated by steam or air and shuts the tuyere at the proper time. We may mention that the converter has been constructed by Mr. White, of Pontomister Steel Works, and the trials were carried out under his supervision and that of Mr. George Green, of Newport, Mon.

WE congratulate our able contemporary, the Baltimore Journal of Commerce and Manufacturers' Record, on arriving at the thirty-second year of its existence. It was among the first journals in this country to give leading prominence to manufactures and industrial pursuits, the importance of a record of which is now so fully recognized. Above all, it has done much to promote the commercial interests of Baltimore. It is the recognized authority for market quotations and trade of that thriving port.

## MECHANICAL RECEIPTS AND ITEMS

CEMENT FOR RUBBER.—Powdered shellac is softened in ten times its weight of strong water of ammonia, whereby a transparent mass is obtained, which becomes fluid after keeping some little time without the use of hot water. In three or four weeks the mixture is perfectly liquid and, when applied, it will be found to soften the rubber. As soon as the ammonia evaporates, the rubber hardens again—it is said quite firmly—and thus becomes impervious both to gases and liquids. For cementing sheet rubber, or rubber material in any shape, to metal, glass and other smooth surfaces, the cement is highly recommended.

CEMENT FOR LEATHER BELTING.—Soak common glue and isinglass (equal parts) for about ten hours in just enough water to cover them. Bring gradually to a boiling heat, and add tannin until the mass becomes ropy. Buff off the surfaces of leather where it is to be cemented; apply the cement thoroughly to the parts to be joined; then warm the parts over a flame or fire for a few minutes, join the two parts properly, clamp firmly or weight them, and allow them to remain undisturbed over night when the belt will be ready for use. This cement is said to make a very strong joint.

A SCREW-DRIVER IMPROVEMENT.—Most people who use screw-drivers must be occasionally inclined to use strong language at their persistency in slipping out of the nick and their refusal to go into it. All that is wanted is a short tube, big enough to enclose the screw-head somewhat tightly, but only spring-tight, so that it may rise as the screw-head comes near the wood. Also to provide for heads of different sizes with the same driver. All this can be done by just turning up a strongish tin tube, 3 or 4 inches long, like a slate pencil case, big enough to slide over the widened point of a round screw-driver, and then fitting spring tight on the shank by means of a piece of leather wrapped around it; and for larger screws than usual, you the socket off and put a larger one on, with a thicker piece of leather. You need not even look at your screw, but just put the tubed screw-driver on, and turn. It will drop into the nick at the first half-turn, and stay there till the screw is screwed home.

TEMPERING STEEL BY COMPRESSION.—A French engineer, M. Clemandot, has invented a process for tempering steel, which consists of heating the steel to a cherry red heat, and then submitting it to great pressure very rapidly applied, and leaving it to cool under pressure. Tempering in the usual manner, by immersing the heated metal in a liquid which is comparatively very cold, is attributed to the rapid contraction of the outer part of the metal, which thus compresses the interior, causing a concentric molecular compression. M. Clemandot made a great number of experiments, chiefly at the works of the French Hydraulic Company, where he had the use of great hydraulic presses and accumulators, which enabled him to apply instantaneously pressures of 13,750 20,625 and 27,500 lbs. per square inch. The steel tempered in this way is powerfully magnetized, and remains so without diminution for three to six months after the process; and the inventor has applied it to articles fully forged and finished, without altering their form. Further experiments are to be made to determine the effects of different temperatures and pressures, and the methods best suited to produce the desired temper in any case.

BRONZING FOR BRASS.—The articles, which must be free from grease and polished, are first immersed for half a minute in a cold solution of 10 gm. of potassium parmanganate, 50 gm. of sulphate of iron (ferrous), and 5 gm. of hydrochloric acid in 1 liter of water. They are then washed off and dried in fine, soft sawdust. If the color has become too dark, or if a more reddish-brown color is required, the objects are immersed, immediately after they have been taken out of the liquid, for about 1 minute, in a warm (66° C=140° F.) solution of 10 gm. potassium permanganate and 50 gm. sulphate of iron in 1 liter of water, and treated as above. By using the second liquid alone, a brighter dark-yellow, or red-brown color is produced.

"BLUE GRASS ROUTE OF OHIO."—The Cleveland, Akron and Columbus Railroad.

### Story of a Great Monopoly.

[FROM THE ATLANTIC MONTHLY.]

Very few of the forty millions of people in the United States who burn kerosene know that its production, manufacture, and export, its price at home and abroad, have been controlled for years by a single corporation—the Standard Oil Company. This company began in a partnership, in the early years of the civil war, between Samuel Andrews and John Rockefeller in Cleveland. Rockefeller had been a bookkeeper in some interior town in Ohio, and had afterwards made a few thousand dollars by keeping a flour store in Cleveland. Andrews had been a day laborer in refineries, and so poor that his wife took in sewing He found a way of refining by which more kerosene could be got out of a barrel of petroleum than by any other method, and set up for himself a ten barrel still in Cleveland, by which he cleared $500 in six months. Andrews' still and Rockefeller's savings have grown into the Standard Oil Company. It has a capital, nominally $3,500,000, but really much more, on which it divides among its stockholders every year millions of dollars of profits. It has refineries at Cleveland, Baltimore, and New York. Its own acid works, glue factories, hardware stores, and barrel shops supply it with all the accessories it needs in its business. It has bought land at Indianapolis on which to erect the largest barrel factory in the country. It has drawn its check for $1,000,000 to suppress a rival. It buys 30,000 to 40,000 barrels of crude oil a day, at a price fixed by itself, and makes special contracts with the railroads for the transportation of 13,000,000 to 14,000,000 barrels of oil a year. The four quarters of the globe are partitioned among the members of the Standard combinations. One has the control of the China trade; another that of the countries of Europe; another that of the United States. In New York you cannot buy oil for East Indian export from the house that has been given the European trade; reciprocally, the East India house is not allowed to sell for export to Europe. The Standard produces only one fiftieth or sixtieth of our petroleum, but dictates the price of all, and refines nine-tenths. Circulars are issued at intervals by which the price of oil is fixed for all the cities of the country, except New York, where a little competition survives. Such is the indifference of the Standard Oil Company to railroad charges that the charge is made the same for points so far apart as Terre Haute, Chicago and Keokuk. There is not to-day a merchant in Chicago, or in any other city in the New England, Western or Southern States, dealing in kerosene, whose prices are not fixed for him by the Standard. In all cases these prices are graded so that a merchant in one city cannot export to another. Chicago, Cincinnati, or Cleveland is not allowed to supply the tributary towns. That is done by the Standard itself, which runs oil in its own tank cars to all the principal points of distribution. This corporation has driven into bankruptcy, or out of business, or into union with itself, all the petroleum refineries of the country except five in New York, and a few of little consequence in Western Pennsylvania. Nobody knows how many millions Rockefeller is worth. Current gossip among his business acquaintance in Cleveland puts his income last year at a figure second only, if second at all, to that of Vanderbilt. His partner, Samuel Andrews, the poor English day laborer, retired years ago with millions. Just who the Standard Oil Company are, exactly what their capital is, and what are their relations to the railroads, nobody knows except in part.

[To be continued.]

THE USE OF ELECTRICITY IN THE REDUCTION OF ZINC ORES.—Although electricity is still too dear to be extensively employed for all purposes, it can be advantageously substituted for coal and heat in the reduction of zinc ores. It may be employed in three different methods, which differ chiefly in the nature of the acid which is used as a solvent. The ores do not require much preparation; the calamine need not be calcined, and it is not even necessary to separate the lead or the calcareous gangues. After having been treated with sulphuric acid, the ores are placed in large basins and the sulphate of zinc is dissolved in water. This solution of zinc salt is allowed to pass through a series of basins, where it deposits part of the zinc in a metallic state, due to the action of electricity, and the liberated acid may be used upon new supplies of ore. The lead, silver and other insoluble matters are collected in the residue, and the iron, which is precipitated upon the lead anode, falls to the bottom of the basin. If the electricity is produced by steam power, the quantity of coal which is required for a given amount of zinc is almost precisely the same as would be required for the same amount of ore in the old methods. The treatment can be conducted at the mine, thus avoiding much of the expense of transportation.

## RAILROADS AND TRAFFIC.

TRACK on the southern extension of the Valley Railroad is laid from Canton, O, south 12 miles to Sparta, leaving only about 5 miles to reach Mineral Point, where connection will be made with the Wheeling & Lake Erie and the Cleveland & Marietta.

THE prospects of the completion of the Connotton (O.) Valley road to Zanesville, its southern terminus, are good. By the time the road is completed, it is probable that the ten coal mines along the line of the road will be in full working order. The outlook for Connotton is much better than ever before.

A CONTRACT has been practically concluded for the sale of the Washington & Ohio road to the Baltimore, Cincinnati & Western Company, which will make it part of its line from Baltimore to Cincinnati.

THE traffic on eastbound freight from Chicago the other week only amounted to 13,600 tons, against 42,500 tons for the corresponding period of last year.

ON the Japanese railroad from Ottarunao to Sapohoro trains frequently start one, two, and three hours behind time, and occupy two or three hours in making the journey.

THE Wheeling & Lake Erie is to be consolidated with the Cleveland & Marietta (O.) line.

THE Erie and the New York, Chicago & St. Louis companies have quite recently entered into a new agreement, under which all clashing of interests will be avoided. The plan is this: The New York, Pennsylvania & Ohio is to be practically abandoned by the Erie, and instead of transferring its east and west through business to the New York, Pennsylvania & Ohio at Salamanca as heretofore, the Erie will make the transfer at Buffalo to the New York, Chicago & St. Louis. All traffic destined to points on the Cincinnati, Hamilton & Dayton and its connections, or coming therefrom, is to be delivered to the New York, Chicago & St. Louis at Lepsic. As will be seen by reference to a map of the several lines, by this arrangement the Erie will get the long haul on all its through business, and the other lines will get the long haul on east and west business proper, and from Buffalo to Lepsic on business destined for points on the Cincinnati, Hamilton & Dayton connections. It is understood that the Erie's through passenger business is to be worked via the same route. At Salamanca the Erie will receive all business that the New York, Pennsylvania & Ohio may deliver to it, but it will not agree to a division of the traffic as between the New York, Pennsylvania & Ohio and the New York, Chicago & St. Louis. The through passenger trains on the New York, Pennsylvania & Ohio will be withdrawn, thus compelling through passengers via that route to change cars at either Dayton or Springfield and Salamanca.

THE railroad war between the Denver & Rio Grande, who are trying to keep the Denver and New Orleans road from entering the Union depot, is still raging. In the fight last night two of the Denver and Rio Grande engines were wrecked. Judge Elliott has granted an order restraining the Denver & Rio Grande from further interference. Serious trouble is anticipated.

THE Union Pacific Company has notified the Chicago railroads of a change in classification which affects freight rates to a radical degree. The new rates advance rates on agricultural implements, wagons and wagon materials to an extraordinary degree, between Council Bluffs and California. It is claimed that the new rates by the overland route will compel manufacturers of agricultural implements and dealers in hardware to consign their California freight via New York and "clipper" transportation to the Pacific Coast. The theory is advanced by some that the advance is made by the overland roads to offset the effect upon their traffic from the opening of the Burlington's new line to Denver.

GOOD MECHANICS.—The workman whose duties require him to do a part of all departments is in a better condition to see where some processes may be improved and some result be facilitated, and comprehend various manipulations better than a workman confined to one branch. Indeed, the improvements in processes, and the suggestions of better results generally come from this class of workmen. Some employers understand this, and see the advantages of giving their apprentices and workmen opportunities. The man who for months past has been running a planer will be transferred to the lathe, and the lathe man set to work at the vise. But as men have their tastes and choice of work, it frequently happens that they show by their work their bent. and are allowed to gravitate to their attraction. The superintendent of one of the best known concerns in the country was asked recently how he obtained that intimate knowledge of the work that enabled him to originate so many improvements. He answered that he learned his trade in a "job shop," where he built and repaired everything, from a steam engine to a hoisting jack. He became an expert at close vise work, was a fair lathe man, could handle a planer or milling machine as well as most, occasionally did a bit of forging and always tempered his own tools. But he was never satisfied with either of these branches. He never trusted to verbal communications in giving his ideas of the work, but always handled a piece of chalk or a pencil stub to illustrate. He became a draughtsman, and on the draughting board have been originated all his new ideas. Now, if this man had been put and kept in the draughting room, it is scarcely to be imagined he would have suggested many improvements in other branches; but his practical acquaintance with tools and processes enabled him to conceive and develop improvements in almost every branch, and to tell *how* a thing should be done, as well as what was to be done. He has many men under him who can do the work in their department better than he can, but there are few who cannot learn something from his suggestions. Such a man is a good mechanic.

OXIDIZING SILVER ARTICLES.—A very beautifu effect is produced upon the surface of silver articles, technically termed oxidizing, which gives the surface an appearance of polished steel. This can be easily effected by taking a little chloride of platinum, heating the solution and applying it to the silver where an oxidized surface is required, and allowing the solution to dry upon the silver. The darkness of the color produced varies according to the strength of the platinum solution from a light steel gray to nearly black. The effect of this process, when combined with what is termed dead work, is very pretty, and may be easily applied to medals and similar objects. The high appreciation in which ornaments in oxidized silver are now held, renders a notice of the following processes interesting. There are two distinct shades in use —one produced by a chloride and which has a brownish tint, and the other produced by sulphur, which has a blueish-black tint. To produce the former it is necessary to wash the article with a solution of sal ammoniac; a much more beautiful tint may, however, be obtained by employing a solution composed of equal parts of sulphate of copper and sal ammoniac in vinegar. The fine black tint may be produced by a slightly warm solution of sulphuret of potassium or sodium. The chloride of platinum mentioned above is easily prepared as follows: Take 1 part nitric acid and 2 parts hydrochloric (muriatic) acid; mix together and add a little platinum; keep the whole at or near a boiling heat; the metal is soon dissolved, forming the solution required.

AMONG the recently granted patents is one for the cooling of dwelling houses, offices, hotels, etc., by means of compressed gas, which is conducted fro.. a street main into the premises in pipes like ordinary gas. The compressed gas on being allowed to expand within a suitable receptacle, produces a very low temperature. Thus the housekeeper, simply by turning the gas faucet, will be able to make ice, supply the dwelling in hot weather with cold air, and produce all forms aud degrees of refrigeration with the utmost facility.

## ITEMS OF INTEREST.

THE longest span of wire in the world is used for a telegraph in India, over the river Kistnah, between Bezorah and Sectanagrum. It is more than 6,000 feet long, and is stretched between two hills each 1,200 feet high.

THE London *Builder* attributes the marvelous durability of mortar in Italy to the fact that the lime remains in a pit covered with water for two years before it is used.

THE gimlet-pointed screw was patented in 1846. It is familiar to everybody, and millions have been realized from its manufacture; yet so simple is the principle that the wonder is that it was not thought out and applied almost as far back as the age of iron.

THE little device of the favorite toy known as the "return ball," which consists simply of an ordinary rubber ball attached to a long piece of elastic, yields to the holder of the patent an income equal to that on a capital of $500,000.

MR. F. C. LAMBERT, 33 Prospect street, Cleveland, dealer in wine and mineral water, and who is also agent for the celebrated Hungarian Ofner Rakoczy bitter water, has been established eight years. In this time he has secured a position in the supply of table or family wines, of choice vintage, wines possessed of a delicate bouquet, and which without undue exhilaration, gratify the taste and stimulate the appetite. He is besides an extensive importer of Champagne and stronger wines. Then as to mineral water, no waters are so easily fabricated, but that which Mr. Lambert purveys is provided from the great laboratory of nature, and possesses restorative qualities beyond human art to compound. His bitter water, with a well-nigh unpronouncable name, comes from a Hungarian spring that has been worth more than a gold mine to the proprietors, owing to its being recommended by the most eminent physicians of Europe. In addition it is a most refreshing summer drink, and possesses remarkable effervescing qualities.

A ROAD locomotive for war purposes, lately tried, weighed 28¾ tons, and drew easily 40 tons weight of guns mounted on their carriages fully equipped. Its maximum traction power is 150 tons, and its cost of maintenance is about 30 cents an hour.

THE Carriage Repository of Mr. J. O. Greene, 408 Superior street and 52, 54 and 56 Rockwell street, Cleveland, presents at this time a superb array of vehicles. Mr. Greene carries the largest stock of carriages in Northern Ohio, and these are of the latest designs. His establishment constitutes a permanently interesting local exhibition of mechanical ingenuity and design in securing for the several classes of carriages the utmost obtainable comfort and convenience, combined with attractive appearance. Since 1868, when his Repository was established, immense improvements have been made in carriage building; old conventional styles having been discarded. Mr. Greene is the agent of the leading manufacturers in this country, firms who are always in the van of improvements. His carriages, too, embody valuable patents, which increase their value without adding to their cost. To survey the carriages in his splendidly lighted Repository, one might suppose that inventive powers had been exhausted in this line, so varied and attractive are the designs.

THERE has been made at Hull, England, a chain of Siemens steel, 180 yards long, containing more than 3,200 links, held together by about 150 steel pins. It is intended for lifting purposes, has an estimated strength of 60 tons, and is thought to be the largest chain of its kind ever made.

THE Corinth Canal has been commenced; it will connect the Gulf of Corinth with the Sea of the Archipelago, and considerably shorten the route from the western parts of the Mediterranean and the Adriatic Sea to Athens and the ports of the Ægean Sea.

THE Chicago Board of Trade has decided that the tender of a higher grade of the same kind of grain shall be deemed a sufficient tender in fulfillment of the contracts for delivery made after June 1, unless otherwise specified by the contract. This decision, it is believed, will be a powerful lever to prevent the cornering of breadstuffs and the forcing of prices up to an excessive rate.

### Electricity on Tap.

A Company has been started at New York for introducing the Faure accumulators, a shipment of which was recently made to that city. The agent of the company says: We can drive locomotives, steamboats or cars at any reasonable rate of speed with ease and smoothness, for there will be no piston rod to rack the machinery. In Paris last July we ran a tramway car carrying fifty people with the force supplied from forty Faure accumulators placed under the seats. We lifted a wheel and got the car off the track. Its motor was strong enough to turn it around on the cobble-stone and put it back on the track again. Any rate of speed can be obtained. The power is self-regulating, and can take any gradient. We will contract to run any number of street cars eighteen hours a day at $3 a day each. We have submitted an offer to light the Labrador at the rate of $10 a day, which is less than the oil lamps cost. The uses to which portable electricity can be put are endless, from lighting a stand lamp, rocking a cradle, or running a sewing machine, to driving a railway train or illuminating a city. The system of electric supply which converts steam power into electric force requires machinery of the best construction, as inequalities of action cause corresponding fluctuations of force. And a light supplied from an unsteady machine is in a constant waver. It does not matter how unsteadily the supply comes to an accumulator, the water power can be utilized as well as steam power. The force is stored and given off in a steady stream.

CHINESE LEAD WORKERS.—Here is a shop—all the houses in Chinese street are shops of one kind or other—where lead working is carried on; where canisters for holding tea are produced; where lamps for burning oil-lights are turned out in highly ornamental and embellished style. Naked, save with a girth around the loins, are the workmen here. One sits over a fire made of charcoal, on which is a caldron made of molten lead. Some thin sheets of lead are wanted, so upon a square block of thin pressed paper a spoonful of the white metal is run. Upon the top of this again another block of paper is placed, and on this the workman, constituting himself a weight, stands This seems a poor, primitive and rude style of doing such business, but mark the result: the top pad is taken off, and a thin sheet of lead lies before you, perfect, save for being uneven at the edges, and the paper pad seems to be barely scorched! Workman number two, with gigantic scissors, cuts this sheet into the desired patterns, fits and refits the pieces, a file bringing them down to the exact dimensions required, while, in a big box, with a wheel before him, like an English street knife-grinder, sits number three, with his lathe, turning corners and emblazoning devices. The work when thus completed is washed with water and scrubbed with sand, and soon shines with the brightness of freshness and novelty. The most remarkable feature about this shop is the fact that while from sunrise to sunset these metalic operations are conceived, prosecuted and accomplished, and the stock thus keeps increasing, nobody is ever seen to enter the premises and buy the wares, nor even to go the length of stopping to inquire their cost.

A PHOTOGRAPHIC GUN.—In taking instantaneous photographs, it is well known that some difficulty is experienced in bringing the object into the field of the camera The process of taking aim at, for instance, a moving object such as a ship, has sometimes to be repeated several times, and in the end the result is unsatisfactory. M. Marrey has, to get over this difficulty, designed a photographic gun. This is neither more nor less than a very large revolver, with a stock to put to the shoulder. The barrel is a telescope; that is to say, it contains the lenses of a camera; there are sixteen apertures which take the place of the chambers. The photographer puts in a sensitized plate behind these apertures, and performing an operation analogous to cocking the weapon, he is ready for the field. On seeing a flying bird he takes aim and pulls the trigger, the chamber revolves once, and in one second he obtains sixteen little pictures of the bird in various positions. Hitherto, M. Marrey has made use of his photograph gun for the purpose of investigating the flight of birds. In this case, clearness of definition is of little consequence, so long as a dark image or silhouette the shape of the bird is obtained, so that it matters little whether the object aimed at be focused or not; but it is obvious that in a multitude of other cases the image can be obtained perfectly in focus. Indeed, it will be seen that the system of thus carrying a small camera to be steadied against the shoulder admits of extension, and may prove of the utmost service to the photographer.

## MISCELLANEOUS RECEIPTS.

GOLD PAINT.—A very fine paint is obtained by mixing gold powder with copal varnish thinned with a little oil of turpentine. Before applying the gold, the ground is prepared by painting it with white lead and yellow ochre in such proportions as to imitate the color of gold as closely as possible. As soon as it is dry, the gold varnish may be put on with a camel hair brush.

TO MAKE BREWERS' PITCH.—Brewer's pitch is made by boiling the staves of rosin barrels in a small quantity of water, adding a little tar, and straining the mixture.

BLACK DYE FOR WOOD.—The following new process is published in a Russian chemical journal: First, sponge the wood with a solution of chlorhydrate of aniline in water, to which a small quantity of copper chloride is added. Allow it to dry, and go over it with a solution of potassium bichromate. Report the process twice or thrice, and the wood will take a fine black color, unaffected by light-air chemicals.

CHEAP VARNISH FOR METALS.—For this purpose dammar can be usefully employed, according to J. J. Hess, of Vienna. With two parts dammar, 4 parts turpenrine, 1 part brown siccative, and two parts linseed oil varnish, a very good lacquer was obtained, which on sheet metal showed a light color with a yellowish shade. Silk paper is rendered transparent by this lacquer. It dries slowly, and is transparent, soft and pliable. This lacquer can be colored a fine red or brown yellow to gold color, by the addition of dragon's blood and asphalt.

TO MAKE A SIMPLE BAROMETER.—A correspondent of The English Mechanic thus describes a simple barometer; Take a glass tube about 7 in. long, and about 2.3 in. internal diameter, and draw out one end before the blowpipe to a point, leaving a very small orifice about 1-100 to 1-60 of an inch diameter. This end of the tube should not be quite sharp, but somewhat rounded. A cork is prepared to fit tightly the wide end of the tube; the tube is then half filled with water, although the exact height is of no consequence, and the cork firmly inserted. The tube should be suspended with the point downward near the window, and it should never be shaken. When the barometer pressure is low, indicating rain, a drop of water will appear at the orifice, and hang to the lower end of the tube. When the barometer pressure rises, the drop will disappear, and a bubble of air may sometimes be seen in the act of entering by the narrow opening. I have had continually a tube of this description hanging in my laboratory, says the writer, for two years, and I find its indications for rain and dry weather most unerring. The only error arises from extremely sudden rise of temperature, which will sometimes force a drop of water out by expansion, although the barometric pressure is high; but in that case the drop soon dries up: in the other case it hangs persistently, and will in many instances indicate the approach of rain thirty hours before the appearance of the storm. Before rain the drop does not dry up, because then the atmosphere is saturated with moisture. The sensitiveness of this weather-glass depends upon the difference of tension between the surrounding atmosphere and the air within the tube, the latter expanding or contracting, according as the barometer pressure is low or high.

THE late spring and frosts in the fruit regions will have a tendency to depress the usually large summer and fall trade in fruit and pickle jars and bottles.

IT is one of the most striking illustrations of the power of machinery that cotton can be brought from the far interior of India, on the backs of bullocks, to the sea, shipped around the Cape of Good Hope to England, manufactured, shipped by the same route, paying repeated commissions and profits, and undersell the native manufacturer on the spot where the raw product is grown, and where labor is considered well paid at 15 cents a day.

## MINES AND MINING.

THE Chrysolite mine, Col., makes continuous and steady shipments of about 50 tons per day.

THE annual report of the Tombestone Mill and Mining Company show heavy returns. Silver $1,325,000, gold, $51,000

MICHIGAN copper mines have paid their stockholders $1,550,000 since January 1, 1882, while all other mines in the United States, including gold and silver, have paid only $4,160,275.

THE Torrence mine, Sorroco district, Mexico, is now being worked, and new and improved machinery is being put in place. Over ninety men are employed, and $1,000 per day in silver is being taken out.

THE Eureka and Richmond silver mines of Eureka, Nev., have contracted with the Southern Pacific railroad to carry about 70,000 tons of lead by rail to the Gulf of Mexico. It will require some 7,000 cars to move this lead, which is the accumulation of several years.

THE coal miners employed at the National mines, Washingtonville, Ohio, who recently struck against the reduction of 10 cents per ton, have gone to work again on the understanding that they are to get whatever prices the striking miners of the valley succeed in getting.

THE market for Comstock, says the N. Y., *Mining Record* has been dull and depressed, and whatever hopes were raised by the recent strong upward movements in the North End stocks, appear to be gradually giving place to the oft recurring disappointment experienced by believers in the famous lode.

THE Carbonate mine, which, with a force of nine men is taking out thirty five tons of ore per day, which, before concentrating, will go fifty ounces in silver and twenty per cent. lead, has thousands of tons of this ore in sight. There are breasts of it in many places from ten to twenty feet wide and from seventy to one hundred feet high, and in one place on the fifth level it is forty-seven feet wide.

LARGE shipments of machinery are being made to Arizona and New Mexico, and fresh orders are coming in. A party of Philadelphia capitalists have started to Idaho silver mines. In a ten days' trial of ore from the Philadelphia and Little River Companies, $35,000 worth of silver ore was smelted at Latham's works on Windmill Island below Philadelphia. They have four smelters at the mines and three more are coming. Two dynamo machines will provide electric light.

THE long deserted mining district of Southern Wisconsin will soon be awakened to old-time activity, a company at Mineral Point being about to begin the manufacture of zinc white, using large quantities of zinc ore, or "dry bone" as it is called in the rough. The hills in the vicinity of Mineral Point are full of the low-grade ore, which, though unsuitable to the manufacture of "spelter" or zinc, is well adapted for zinc white. The price of ore is now double what it was when the mines were abandoned.

LAUNCHING A SHIP BY ELECTRICITY.—In launching the gigantic English turret ship, appropriately named Colussus, on March 21, electricity was employed by means of an ingenious contrivance which connected the dog-shores with a large magnet; and in a similar manner the christening was performed. The pressure of the launching button was followed by a heavy thud. The weight had fallen and the dog shores had been knocked away. The ship moved instantly, and the huge mass of 4,420 tons—the heaviest ever launched from the Portsmouth yard—glided gracefully down the inclined plane into the harbor, amid the music of the bands and the enthusiastic cheers of the multitude.

THE crop prospects on the Pacific coast are reported as very favorable. California has enjoyed abundant rains and now feels secure of a large yield of grain. In Oregon the conditions are uniformly good for a rich harvest, and the extension of the North Pacific railroad back into the valley of the Columbia river will make available the crops of a great area of fertile country that has hitherto been practically shut out from the market.

## REVIEWS.

*European Breezes.* By MARIE J. PITMAN. (Margary Deane.) BOSTON: Lee & Shepard. CLEVELAND: Burrows Bros., 384 Superior street.

This work is what its name imports, refreshful, cheering and enlivening; a book of sensations, and experiences, and incidents, and free from wearisome accounts of travelled routes and thrice-told descriptions of celebrated places. Each scene, and the views given are to be counted by the score, are vividly sketched in a few clever strokes, and the individuals who play their separate parts have strong personality as well as nationality. Whether treating of Hamburg, with its dainty maids and street sights, of the aristocratic jews of Frankfort, of the domestic ways of different nations, or in the capacity of a looker on at Vienna. Instead of wasting pages on the blue Danube, the panorama is crowded with noticeable people, and the reader has a portion of the pleasure and instruction of a river passenger. The authoress's experiences in Hungary, whether enjoying Bohemian out-door life, among peasants and gypsies, or the companionship of the proud Maygars, the real governing class, reads delightfully. The chapter "Once Upon a Time in Switzerland" presents experiences one would like to share, but to realize full enjoyment from these, one should have the happy spirit and keen insight into character possessed by the gifted authoress. "What it costs to Travel in Europe" is a useful chapter, abounding with common sense suggestions that, if attended to, will save the pockets of American tourists in Europe from being so thoroughly depleted as heretofore. The work is all the more racy that it is written from memory. The reader will here find the domestic life of foreigners portrayed, their superstitions, their faith, and their traditions. It is remarkable that books of travel written by men afford no insight into the real characteristics of the women of foreign countries, sketches of whom constitute one of the leading charms of European Breezes.

*A Few Facts and Suggestions on Money, Trade and Banking.* By J. H. WALKER. BOSTON: Houghton, Mifflin & Co. CLEVELAND: Burrows Bros., 384 Superior st.

This book has the recommendation of having been written by a business man as the result of his own observation and experience. Banking is taken up in its practical details, and with freedom from technicalities. All persons having dealings with banks will profit by its perusal, obtaining, in addition to full acquaintance with banking functions, a clear and intelligent apprehension of the nature of currency and its substitutes, and of the trading and banking offices it performs. He observes:

"Very few writers on finance now dispute the proposition that any restrictive interference with the mobility of capital results in injury to the mass of the people. To-day, as compared with a century ago, capital seems almost liquified. Investments were never before so insecure to the individual, and never so permanent to society. Capital was never so equally distributed, was never increasing so rapidly, and the mass of the people was never so secure in its use, enjoyment and possession. In bringing this to pass, and in all the progress we have made in commercial exchanges, banks have been a safe and indispensable agent, and none of them more so than those established under the present National Bank Act."

The author maintains that currency, to have value and function as money, must be based upon coin; that the Government should leave the business of issuing currency wholly to the banks; that banks exist in the interest of the people, and any curtailment of their powers, whether in the guise of taxation or by unfriendly legislation, is by so much an addition to the public burdens. In borrowing, lending, and transferring capital of any description, he advocates the utmost freedom; in other words, that individuals should be left untrammeled, a view that is undoubtedly sound. As to money, he shows that the Government coinage stamp adds nothing to the value or purchasing power of gold, which is determined by intrinsic worth, gold, besides being more than money, namely, property, capital, all other things which do the work of money, such as checks, drafts, bills of exchange, etc., being merely titles to property. We heartily recommend this work, to which it is impossible in the compass of a review to do full justice. The appendix contains a summary of the principle restrictions and requirements of the National Bank Act.

*Hereditary Traits and Other Essays.* By RICHARD A. PROCTOR. New York: Fitzgerald & Co., 30 Lafayette Place. Cleveland: Cobb & Andrews.

This is one of the reprints of popular scientific works known as the Humboldt Library. Among all the popular expositors of science in the English language there is no author who excels Proctor in charm of style, in breadth of scholarship, or in the faculty of making even the more arduous problems of science easy for the intelligence of the general reader. The multitude of facts brought out in the notice of hereditary traits will interest every reader

INK.—As every one is a user of ink, the following particulars will prove interesting. Much of the fault found with ink on account of its fading is chargeable to the paper rather than to the ink itself. Old paper shows very different results. Some documents are fading, while others are permanent, and yet both may have been written with the same ink. It is often possible to get entirely different results from the same ink by using different kinds of copying papers. Chemicals remaining in the paper have much to do with this change of color. The weather frequently makes a change in the durability of copied documents. If great durability is wanted when nothing is to be feared from alteration, there could be nothing better than India ink. This is composed of a gum or size and a very pure lamp black. A trace of soda, or better carbonate of ammonia, would tend to correct its "greasiness" and make it flow better. The cheap "school" inks ought never to be used for valuable documents, and above all things the aniline ink should be avoided. So far as is now known, all these inks are very fugitive. Some of them will show signs of fading within a year or two. None of these are to be trusted, whether they be red, black, blue or violet. The Declaration of Independence is becoming illegible. It went first to Philadelphia and then to Baltimore to be copied in fac simile, and it has been handled and traced so often that many of the names can no longer be seen. The old inks have stained through to the back. This is not due so much to the fading of the ink as to the absolute rubbing of the surface by the old processes of tracing employed before the days of photography. There is probably not a line left on the surface which the signers ever saw. The French Government departments keep their records in an American ink and there is no doubt that we rank first of all nations in the production of good indelible inks.

SCALE PREVENTING BOILER EXPLOSION.—A correspondent of the Boston *Manufacturers' Gazette*, writes: In 1874 I examined a steam boiler which had been in use for some twenty years under the conditions above specified. Its dimensions were fifty-six inches by twenty five feet, and it had two fifteen inch flues. I found the flues at the back end of the boiler so corroded as to leave a mere shell only, a slight blow upon which with a small hammer was sufficient to produce a break. The iron had evidently entirely lost the properties which would render it valuable for boiler plate. The engineer stated that the boiler had been removed more particularly on account of its lack of capacity to perform the increased work required of it, rather than from any defect which it possessed. The previous season the pressure had been increased to eighty or ninety pounds in order to perform the required service. Probably this corrosion and weakening of the plates had been of gradual growth; hence, at the time when the boiler was in its weakest condition it had been run at its highest pressure. Now, will the insurance companies inform me at what stage of its existenee the hammer test would have condemned that boiler? If weakness of the flues is the great source of danger, why did not that boiler explode? It was apparent that the corrosion had formed from the inside of the flues, and was the result of exposure. This tendency to enhance the chances of an explosion were counteracted, in a measure, by the hard scale, the presence of which I have noted. From the circumstances of the case I infer that this scale operated in two ways for the safety of the boiler. First, it strengthened and protected the iron against rupture; and second, it formed a conducting substance which rendered it more difficult to superheat the water. Suppose, in this case, the scale had been removed by the feeding of condensed steam to the boiler, would not such a course have produced a favorable condition for an explosion?

**MEAT PRESERVED BY BORACIC ACID.**—Some additional experiments have been made in London to test the value of the new method of preserving carcasses by the injection of boracic acid. At a dinner where mutton had been preserved in this way for forty days boiled and roast joints were served; the meat retained its natural juiciness and flavor, and was free from any taint or taste of the antiseptic chemical which had been used. Five or six ounces of the boracic acid seems to be sufficient to preserve the carcass of a sheep of eighty or ninety pounds. The antiseptic is used by injecting it into a vein while the animal, though stunned by a blow on the head, is still alive, and the action of the heart is relied upon to pump it through every part of the body into which the arterial system ramifies.

# MARKETS.

## FINANCIAL.

Office of TRADE REVIEW AND WESTERN MACHINIST.

FRIDAY EVENING, June 2.

Business in monetary circles has been large. The money market continues easy with moderate applications for discount, which are met by the banks at 7@8 per cent. Call loans are negotiated at 5 per cent. and time loans 6 per cent Eastern exchange firm.

### IRON.

An unsettled feeling pervades the iron trade in consequence of the strikes which the Amalgamated Iron and Steel Association has seen fit to initiate. So far the wisdom of the movement is not apparent. In Cincinnati the Amalgamated Association are pledged by written agreement to continue work at the 10 per cent. advance until the Pittsburgh scale is determined. The puddlers of Cincinnati have received a monition from the President of the Association to abide by the terms of that agreement. At Pittsburgh the strike movement has probably been precipitated by the recent reduction in the card rate for finished iron, which will involve a reduction in the scale for puddling, with a corresponding decrease in the rates of other skilled labor employed in the mills. The policy of the Association to localize its strikes; to win a battle in one district before interfering with another, would appear to have been foregone in its action. The wide scale of its present operations would seem to betoken an overestimate of its strength. There is evidence of a strong combination among iron and steel manufacturers to support each other in maintaining their ground. Quietness characterizes the iron market. There have been large deliveries on old contracts. Consumers generally continue to limit their purchases to immediate requirements, carrying no surplus stocks. Prices have been easier. Mill irons have been placed on lower terms than any time for many months. Leading brands alone continue to maintain their position. The business for steel and iron rails has been moderate; we quote steel at mill $47.50@52, according to delivery. The demand for old rails has improved; the asking price is $26.50@27; double-heads are quoted at $27@$28. With steel rails foreign pig and finished iron declining, domestic pig has necessarily a downward tendency. Small lots of No. 1 X Foundry have sold at $25 to $25.50 for standard brands, No. 2 X, at $23.50 to $24, while grey forge at furnace has been offered at $21.50 to $22.50 for best brands. For Scotch Pig we quote Coltness $26 to $26.50. Gartsherrie in yard $26, Glengarnock $24 to $24.50; Summerlee, $25; Carnbroe $23 to $23.50; Eglinton, $22.25 to $22.50. Scrap continues depressed, with little business doing; prime selected wrought scrap is quoted at $29. Cast steel is well maintained, and does not afford indications of the weakening that characterizes the markets. Prices in manufactured iron show irregularity. We quote bars at $2.60, but the price may be shaded. For structural iron there is an increased demand, and prices are firmer.

CINCINNATI—(Reported by E. L. Harper & Co.)—Consumers are only buying small lots for quick delivery. We quote as follows: Hanging Rock Charcoal, No. 1, $27.00@$28.00; Strong Neutral Coke, No. 1, $24@$25; American Scotch, $23.00@$24.00. Grey Forge—Neutral Coke, $22.00@$23.00; Cold Short, $20.50@$21.00; Car Wheel and Malleable—Hanging Rock C. B. $34.00@$36.00; Hanging Rock Warm Blast, $28.00@$30.00; Lake Superior, No 1 & 2, $31@32.00; Lake Superior, No. 3 to 6, $32@34.00; Southern Car Wheel, $35.00@$37.00.

CINCINNATI—(Reported by Rogers, Brown & Co.) The puddlers have submitted a demand that present wages be continued for one year. Foundries are buying what they need for present use, and waiting for developments. We make no change in last week's quotations, which are for four months: Hot Blast Foundry, Hanging Rock, C.C., No 1, $28.00@$29.00; No. 2, $27.00@$28.00; Southern, No. 1, $26.00@@27.00; Strong Coke, No. 1, $25.00@26.00; No. 2, $24.00@25.00; No. 3, $23.00@24.00; Soft Stone coal No. 1, $23.00@25.00; No. 2, $22.00@$24.00. Forge—Strong, Neutral, No. 1, Mill, strong $21.50@$23.00; Cold Short, No 1 Mill. $20.00@22.00 Car Wheel and Malleable Hanging Rock Cold Blast, $34@35; Hanging Rock Warm Blast, $27@29; Southern Car Wheel Iron $35@37; Lake Superior, $32@34; Lake Superior Malleable, $32@$34.

### HARDWARE.

The Hardware trade, though not up to expectations, is fairly active. Nails continue to be sold below card rates, and purchasers of large quantities obtain considerable reductions, but stocks on hand are limited, and those having orders are anxious for delivery. We quote 10d. to 60d., $3.25 per keg, net, but for a desirable order this price could be shaded a trifle. There is a good run on agricultural implements. For barb wire the demand is active. The trade in brass and copper wire is on the average of last year's transactions at this time. No material changes have been made in price lists.

### COPPER.

Lake is firm at 18¼c; nothing is transpired in future. Baltimore is 17¼@18c. Manufactures are unchanged in price. We quote: Bottoms, 31c@32c; Braziers, 30c@36c; Circles 33c@36c; Sheathing, 28c, and Bolt Copper, 30c; Segment Sheets, 33c; Fire-box ditto, 30c.

### LEAD.

Sales of Common Domestic have been made at $4.60@4.75. Market prices are weak. Moderate sales of Refined have taken place at $4.85.

### TIN AND TIN PLATES.

There has been little activity in tin: Straits is 22c. Prices in London are cabled as firm. The market for tin plates has been active, and some lines of coke tin have been taken at $5.12½c. We quote in large lots, ordinary brands, per box: Charcoal Bright, $6@$6.25; ditto Ternes, $5.37½@$5.50; Coke Tin, $5.12½@$5.25, and ditto Ternes, $5.12½. Liverpool cabled yesterday: Coke Tin, 15s. 6d., and Charcoal 20s.

### SPELTER AND ZINC.

A large business has been transacted in Silesian spelter, sales being at 5.60 to 5.62 cents for shipment and 5.65 for spot. Domestic brands are obtainable at 5.70 to 5.75 cents. Foreign and Domestic Sheet from store we quote 7 1-2 to 7 5-8.

### LUMBER.

The improvement of the weather has advanced the scale of business at the yards. List prices are held with considerable firmness. From the present outlook it is believed that the trade of the coming season will be large. Cargoes appear to have strengthened.

# LUMBER.

PLANK, MIXED WIDTHS.
2 inch, 12, 14 and 16 feet, together.

| | |
|---|---|
| A 1 and 2 | $50 |
| A 3 | 40 |
| B | 32 |
| C | 21 |
| D | 15 |
| E | 13 |

1¼ and 1½ inch.

| | |
|---|---|
| A 1 and 2 | $48 |
| A 3 | 40 |
| B select | 32 |
| C | 21 |
| D | 15 |
| E | 13 |

BOARDS.
One Inch, mixed widths.

| | |
|---|---|
| A 1 and 2 uppers | $44 |
| A 3 | 36 |
| B select | 30 |
| C | 20 |
| D | 15 |
| E | 13 |

STOCK BOARDS.
12 Inches wide.

| | |
|---|---|
| A 1 and 2 | $45 |
| A 3 | 38 |
| B | 32 |
| C | 21 |
| D | 16 |

STRIPS.
6 Inches wide.

| | |
|---|---|
| A 1 and 2 | $42 |
| B | 35 |
| C | 22 |
| D | 17 |
| E | 13 |
| Norway Fencing Strips | 17 |
| Norway Flooring Strips | 25 |

WORKED LUMBER
FLOORING.

| | |
|---|---|
| Flooring—A 3 | $42 |
| B | 38 |
| C | 24 |
| D | 20 |
| Norway Flooring—A 3 | 28 |
| C | 22 |
| D | 18 |
| Matched Drop Siding, 6 inches—A 3 | 42 |
| B | 38 |
| C | 24 |
| D | 20 |

Beaded Ceiling $2 higher than Flooring.

| | |
|---|---|
| One half inch Bevel Siding—A 1 and 2 | 24 |
| A 3 | 20 |
| B | 18 |
| Ash Flooring—A 1 and 2 | 40 |

BILL STUFF.

| | |
|---|---|
| Small, joists, 12, 14 and 16 feet | $15 |
| 18 feet and under | $16 |

Timber, larger than 8x8 special.
Timber, longer than 18 feet, adds about $1 per foot per M. extra.

| | |
|---|---|
| Cedar Posts, large | 30 00 |
| " " medium | 25 00 |
| " " small | $15 to 20 00 |

SHINGLES, LATH AND MILL WORK

| | |
|---|---|
| Shingles XXX | $4 50 |
| Clear Butts | 3 25 |
| Lath | 3 00 |

Surfacing, one side, adds $1.25; two sides $1 50
Matching, flooring and drop sidings, $2.50.


## Sunday Church Trains

**OVER THE BLUE GRASS ROUTE OF OHIO.**

COMMENCING May 21st, 1882, we will run Sunday Church Trains as follows: Leave Millersburg 7:50 a. m., stopping at all intermediate stations, arrive at Columbus 10:20 a. m., in time for church. Return, leave Columbus at 4:00 p. m.

Trains North leave Millersburg 7:50 a. m., arrive at Hudson 10:30 a. m., and return at 4:30 p.m

This will enable parties to attend church at Akron, Cuyahoga Falls, or Hudson, and return home the same day. Round trip Sunday tickets at greatly reduced rates will be sold on Sundays, —good for that day only.

E. T. AFFLECK,
Gen'l Pass'r Agt.

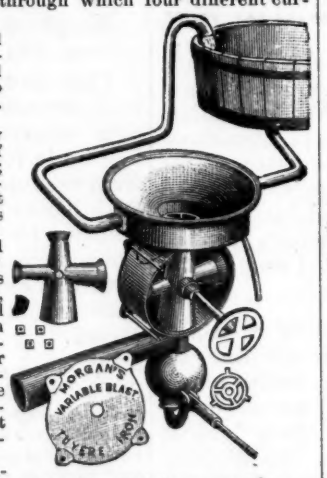
H. C. CHANDLER
Engraver on Wood
Cor. Circle & Market Sts.
JOURNAL BUILDING INDIANAPOLIS, IND.

J. P. MERRIAM,
Manufacturer and dealer in
**New and Second Hand Machinery.**
"New Favorite" Circular Saw Mill, Portable and Stationary Engines, Boilers, to order, Iron and Wood Working Tools, Pipe and Fittings, Belting, Steam and Water Gauges, &c., &c.
**Hot Polished and Turned Shafting, Pulleys, Hangers, &c.**
**Emery Grinders and Wheels.**
Office and Warehouse, adjoining C. S. & C. R.R. Passenger Depot, 1113 Water Street, SANDUSKY, OHIO.
Send for Circulars of New and Second Hand Machinery, of all classes, Boilers and Engines.

**Greatest Rock Breaker on Earth.**
Capacity--- **A Ton a Minute.**
Don't Forget It.
Guaranteed to do Double the Work of any other or Money Refunded.
Send for Circulars.
**ALSO, ENGINES, BOILERS, STAMP MILLS AND MINING MACHINERY,**
GATES & SCOVILLE IRON WORKS.
**52 Canal Street, Chicago, Illinois.**

**GREAT WESTERN OIL WORKS.**
ILLUMINATING OILS, LUBRICATING OILS,
**Naphtha & Gasoline.**
Orders solicited in Bulk, Barrels or Cases.
**Scofield, Shurmer & Teagle,**

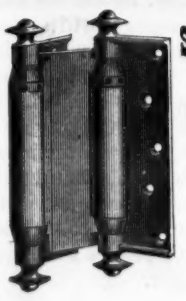
FOR SALE.
One 15-H.P., mounted Threshing Machine.
One 10-H. P. Threshing Machine.
One 8-Horse Power.
Address
NATIONAL MACHINERY CO.
Cor. Bond & Superior Streets, Cleveland, O.

THE MORGAN
**Variable Blast Water Tuyere Iron.**
With the front plate removed, showing the rotating air tubes through which four different currents of air may be passed thereby making any sized fire from two to eighteen in. diameter.


It actually saves one-half of the coal; makes an intense heat just where it is needed, and burns no coal unnecessarily Always gives a centre blast, and cleans all the dirt from the fire. Supplies hot water
We also furnish a Tuyere on same principle without Water Attachment. All goods guaranteed to please or no sale. Catalogue sent free.
Address, A. W. MORGAN & CO.
52 Vance Block, Indianapolis, Ind.

JOYFUL News for Boys and Girls!! Young and Old!! A NEW INVENTION just patented for them, for Home use! Fret and Scroll Sawing, Turning, Boring, Drilling, Grinding, Polishing, Screw Cutting. Price $5 to $50. Send 6 cents for 100 pages.
EPHRAIM BROWN, Lowell, Mass.

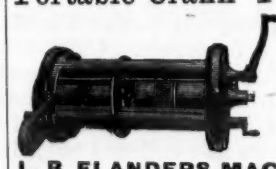
$5 STANDARD ELECTRIC BELT
THAT FAMOUS STANDARD $5 ELECTRIC BELT
gives strength to the Weak and Nervous, and will alone retain its reputation forever as the infallible conqueror of Pain and Disease. Circulars free.
AGENTS WANTED.
**Standard Galvanic Co**
CLEVELAND, OHIO.


THE COMPOUND
**SPIRAL SPRING HINGE,**
has the lightest and
**Most Elastic Movement**
Combined with
THE GREAEST POWER.
Manufactured by
LORENZO BOMMER,
84 Pearl Street, cor. Front,
BROOKLYN N.Y.

$$$$$$ SAVED! $$$$$$
Twenty-nine Hundred Seventy-seven
2977 MACHINES 2977
**NEW & SECOND-HAND**
comprising Machine and Blacksmith Tools of every description. Woodworking Machinery in all its Branches, Portable Engines, Upright and Horizontal Stationary Engines, 1 to 300 horse power, Locomotive Fire-box, Horizontal and Upright Boilers, 1 to 100 horse power, Waterwheels, Cotton and Woolen Machinery, Steam Pumps, Grist Mill Machinery, &c.. &c., &c.
S.C.F.&CO.
Fully described, with prices annexed, in our List 28. Send stamp for same, stating what you want.
We have the largest assortment of Machinery to be found in the hands of any firm in the country.
Works and Main Office,
**Manchester, N. H.**
S. C. FORSAITH & CO.
Branch Office and Wareroom, 209 Center Street, New York.

E. Fawcett. R. B. Fawcett.
**E. FAWCETT & SON,**

Proprietors of
ALLIANCE INDUSTRIAL WORKS,
Manufacturers of
STEAM ENGINES,
**and Circular Saw Mills.**
Specialty of Portable Saw Mills and High Speed Engines.
ALLIANCE, OHIO.

Portable Crank Pin Machine.

For turning off crank pins in position and while wheels are under engine.
**L. B. FLANDERS MACHINE WORKS,**
PEDRICK & AYRE, PROP'RS.
**1025 Hamilton Street, Philadelphia, Pa.**
New Descriptive Circular on application.

# Cleveland Wholesale Prices.

## HARDWARE.

### Adzes.

Carpenter's.....per doz $18 40
Ship..... " " 18 75
Heavy railroad.... " " 19 50

### Axes.

Hunt's.....℔ doz $ 9 50
Lippincott's Crown.℔ doz 9 00
Cut More.℔ doz 9 00
Peck's Double Bit..℔ doz 22 00
" Champion Blade ℔ doz 11 00

### Anvils.

Eagle, Amer...per lb. 10c dis 20
Wright's..... 10¾c@11c
Armitage's Mouse Hole 9¾@9¾c
Trenton..... 10¾c
Wilkinson's..... 10¾c

### Anvil Vise and Drill.

Millers Falls Co. $28.....dis 20
Cheney Anvil and Vise.dis 25&2

### Vises.

Solid Box, list of July 1, '79, dis 35
Solid "Crown" (A. H. Hildick).....40 to 100 lb. 15c net
Solid, Peter Wright's.....15½
Solid, Wilkinson's.....13½
Parallel, Parker's.....dis 40
Saw Filers, Hopkins' ℔ doz $17.50, dis 10
Reading.....dis 45&10
Cowell Hand Vises.....dis 20
Richardson's Vise and Anvil.....dis 25

### Augurs and Bits. Dis

C S cut augurs.....40&10
do do do bits.....40&10
D C gimlet do Ives.....dis 50
Snells bits.....dis 40
Russell Jennings' augers dis 16⅔ &10&10
Cook's pat augur.....40&10

### Animal Pokers.

Berea, per doz..... 4 00
Eagle, per doz..... 5 00

### Apple Parers.

Domestic & Reading ℔ doz.$7 50
Turn Table..... 5 00

### Bolts.

Machine.....dis 60
Bolt ends.....dis 60
Plow.....dis 50
Plow, R. B. & W.....dis 40
Cast Iron Barrel Shutter, etc.....dis 50&10
Cast Iron Chain (Sargent' list).....dis 60&10
Ives' Pat. Door Bolts..dis 50
Wrought Barrel.....dis 55&10
Wrought Square.....dis 55&10
W'g't Shut'r, all iron, Stanley's list.....dis 50&10
Union Carriage.....dis 70
Tire, R. B. & W., new list.....dis 70&10
Stove, American Screw Co.'s.....dis 40

### Bellows. Dis

Blacksmith's com new list, 45℔ct
Moulder's new list, dis 25 ℔ cent
Hand, new list, 25 per cent

### Butts. Dis

Wrought brass.....65&10
Cast, loose joint.....10&10
Pin, japanned and silver tipped.....45&10
Wrought, fast joint narrow.....40&10
Wrought fast joint broad.....40&10
Wrought loose joint broad.....45&10
Wrought table and back flaps.....40&10
Loose joint, reversible.45&10

### Cleveland Stamped Elbows

Genuine Russia Iron

4 inch per doz..... 4 50
4½ do do..... 5 50
5 do do..... 7 50
5½ do do..... 8 50
6 do do..... 9 50
7 do do.....11 00

Planished American Russia Iron

4 inch, per doz..... 4 00
4½ do do..... 5 00
5 do do..... 6 50
5½ do do..... 7 50
6 do do..... 8 50
7 do do..... 9 50

Charcoal Iron

4 inch, per doz..... 2 00
4½ do do..... 2 50
5 do do..... 3 50
5½ do do..... 4 00
6 do do..... 4 50
7 do do..... 5 50

25 per cent

### Chisels.

Hot and cold cutting.....℔ lb 30
Railroad track.....30
Machinists.....30
Mallet head.....50
Cape.....50
Packing.....50
Stone cutters.....50

### Crowbars.

Steel point.....℔ lb 5
Cast steel.....7½

### Cutlery, Pocket and Table.

Meriden Cutlery Co, table..net
Am. Miller Bros.' Cutlery Co.....dis 25
Humason & Beckley, pocket 33⅓
Naugatuck Cutlery Co...list net
Aaron Berkenshaw's pocket dis 25

### Crucibles.

Per number..... 4@ 4½

### Novelty Clothes Wringers

Keystone per doz..... 42@45

### Chains.

Coil by cask.....

| 3-16 | ¼ | 5-16 | ⅜ | 7-16 | ½ |
|---|---|---|---|---|---|
| 10¾ | 9 | 8 | 7 | 6¾ | 6¼ |

### Drills and Drill Stocks.

Blacksmiths', each...$2.50 dis 10
Blacksmiths', self-feeding, each 7.50 dis 20
Breast, P. S. & W.....dis 20&10

### Drawing Knives.

Discount.
Witherby's.....60@10 ℔ cent
Barton's.....15
Adjustable handle....10

### Emery.

Genuine Chester..... 7@ 8
Wellington..... 10@12

### Files.

Auburn...$5 to £. dis 35 pr cent
E. M. Boynton's, new list..dis 25
J. & Riley Carr.....4.50 to £.
Johnson & Bro.....dis 30
Butcher's.....4.50 to £.
Walter Spencer & Co.'s "Diamond".....4.50 to £.
Fisher's.....4.75 to £.
Moss & Gamble.....4.50 to £.
H. Disston & Sons (new list).....dis 40 per cent
Heller Bros.' Horse Rasps dis 25
Nicholson.....dis 40
New American.....dis 40
Union File Co.....dis 40

### Grindstones.

Ohio.....1¼@1¾ ℔lb
Nova Scotia.....1¼@1¾ ℔lb

### Hatchets.

Yerkes & Plumb:--Shingling, Nos....1, 2, 3, ℔ doz $7 50, $8 00, $8 50, dis 25
Claw, Nos....1, 2, 3, ℔ doz $8 25, $8 75, $9 25, dis 25
Lathing, Nos....1, 2, 3, ℔ doz $7 50, $8 00, $8 50, dis 25

### Horse Rasps.

Heller's.....dis per cent 30
"Arcade"... 50 & 20

### Harrow Teeth.

Iron ⅝ to 1 inch.....per lb 3¾c
Steel, square..... 4¾c

### Hammers.

Mason's stone hammers, steel faced and pene.....℔ lb 18
Mason's stone hammers, solid cast steel..... 23
B. S. Napping hammers 30
Striking hammers, solid cast steel, 5 to 25 lb..... 18
Drilling hammers, solid cast steel, 3 to 6 lb..... 18
Turning hammers, full polished.....each 2 00
Set hammers.....℔ lb 35
Creasing hammers..... 35
Ordinary bush hammers 55

### Nails.--BRADS AND FENCE.

10 to 60d..... 3 20
8 and 9d advance..... 25
6 and 7d..... .....do.... 50
4 and 5d..... 75
3d..... 1 50
2d..... 2 75
3d fine..... 3 00
2d fine..... 3 75
⅞ inch..... 3 00
4d barrel..... 1 00
1¼ inch barrel nails..... 1 50
1¼ do do do..... 1 75
1 do do do..... 2 50
⅞ do do do..... 3 00
Cut spikes, all sizes..... 25
Clinch nails, all sizes..... 1 75
Casing and box nails 75 cts advance
Finishing nails, $1 25 do
Tobacco nails, 50 cts do

### Nuts and Washers

Nuts, square.....7c off list.
Nuts, hexagon..... 7c. off list.
Washers.....6c off list.

### Picks.

Railroad, 4 to 5 lbs...doz $7 75
5 to 6 lbs... 7 75
to 7 lbs... 8 50
7 to 8 lbs. 9 50
Railroad Tamping Pick.....
7 to 8 lbs..doz 13 50
Mill Picks per lb..... 75c

### Rivets.

Iron.....dis 40
Tinned.....dis 40
Copper.....dis 33⅓

### Squares. Dis

Steel or iron, case lots.....50
Try squares and T bevels.....40

### Spikes—WROUGHT

All lengths by ¼ inch.....4½c
do do do 5-16..... 3½
do do do ⅜, 7-16 & ½in 3¼

### Shovels and Spades.

Ames' new list, July 1, 1881, ..... dis 15
Old Colony.....dis 15
Remington's (Lowman's Patent).....dis 30
Rowland's.....dis 40 and 10
Griffiths.....dis 40&10

### Saw Sets.

Boynton s patent X Cut, per doz $12; Hand Saw, per doz $10.....dis 20
Stillman's Genuine, per doz $3 50 and $5 50.....dis 20
Stillman's Imitation, per doz $3 25.....dis 20&10
Common Lever, per doz $2 dis 30&10
Leach's No. 0 $8; No. 1 $15; dis 15
Hammer, Hotchkiss $5 50, dis 10
" Bemis & Call Co.'s new patent.....dis 40&5
Bemis & Call Co.'s Lever and Spring Hammer..dis 30&5
Bemis & Call Co.'s Plate..dis 10
" " Cross-cut dis 12½
Aiken's Genuine...$13, dis 50&10
" Imitation.....$7, dis 50
Hart's Patent Lever.....dis 20
Disston's Circular.....dis 40

### Sad Irons.

From 4 to 10 lbs....per lb 3¾ net
Self-Heating.....℔ doz $9 net
" Tailors..℔ doz $18 net
Gleason's Shield and Toilet.....dis 25
Mrs. Pott's Irons, double pointed.....dis 35
Mrs. Pott's Irons, square back.....dis 35
Enterprise Star Irons.....dis 40
Combined Fluter and Sad Iron.....℔ doz $15, dis 15

### Bag Holders.

Sprengle's Pat, $18.00 per doz 40 per cent. dis.

### Planes.

Ohio Tool Co.....dis 20
Sciota.....dis 25
Bailey's Pat. Adjustable..dis 25

### Rules.

Stanley.....dis 66⅔ and 10

### Sash Locks. Discount.

Payson Mnfg. Co. "Perfect"..42
Simmons' Sash Supporters....20

### Hinges.

Champion double acting spring hinges.....dis. 30
Screw & Strap 8@12 in.....$6. net
Gravity Locking Blind Hinges, Sargeant & Co. 70&10

### Screws. Dis

Flat head iron or steel per cent dis.....30
Flat head brass.....30
Round head iron or steel..25
Round head brass.....20
Brass and Silver capped..40
Japanned, list of Plain Screws.....20
Coach, patent Gimlet point, list per 100.....60
Lag, taper points.....60
Bed.....10
Machine, flat head, iron..55
round head, iron 50
Bench, iron.....55&10
wood, beech, per doz $3.....10
wood, hickory.....20&10

### Scales. Dis

Fairbanks'.....25

### Tank Iron.

3-16, ¼ and ⅝ inch thick.... 3 20

### Tacks. Dis

Black.....30—10
Tin'd.....5c

### Traps. Dis

New House.....80
Peck, Stow & Co..... 50—10

### Valves. Dis.

Jenkins' Patent Gate Valves..35
" " Globe " ..40
" Standard Packing " ..20

### Wrenches.

Coe's genuine.....40 & 10
Coe's imitation wrought bar..60
Mechanics'.....60 and 10

### Wire.

Brass and Copper.....dis 20
Bright & annealed, Nos. 0@18 dis 50@52½
" " Nos. 19@26 dis 60
" " Nos. 27@36 dis 65
Coppered.....Nos. 0@18, dis 45
Galvanized, Nos. 0@18, market list.....dis 40@45
Tinned, Nos. 0@18,....dis 40@45
Cast steel.....dis 40
Tinned Broom Wire, Nos. 18@25.....dis 55
Annealed Fence, Nos. 8 and 9.....dis 55@52½
Annealed Grape, Nos. 10 to 14.....dis 52½
Galvanized Telegraph, Nos. 7 to 9.....℔ lb 7¼c
Galvanized Telegraph, Nos. 10 to 11.....℔ lb 8¼c
Galvanized Telegraph, No. 12.....℔ lb 10¼c
Fence staples....℔ lb 5½@5¾c
Fence Staples, galvanized, ℔ lb 7@7¼c
Stubs Steel Wire....$7 00 to £
Barb Wire, painted..... 8¼c
Barb Wire, galvanized.....9¼c
Crucible Steel Ropes from ¾ in. at 9c to 1¼ in. at.....52c
Best Selected Iron Ropes from 3-16 in. at 3c. to 1¼ in. at.....33c

### Boiler Plates.

("Gaylord"--Standard Quality.)
C. No. 1..... 4 50
C. H. No. 1 Shell.....4 60
C. H. No. 1, 50,000..... 5 00
C. H. No. 1, 55,000..... 5 50
C. H. No. 1 Flange..... 6 00
Firebox.....
T. S., 60,000.....(as per)..6 00
T. S., 65,000.....(act of)..
Homo. Steel, 70,000 (of Cong).8 00
Heads, ¼c ℔ lb extra.
N.B.—Eastern brands of boiler plate at from 2-10 to 3-10c ℔ lb less than above prices.

### Sheet and Tank Rivets. "Norway."

All sizes.....dis. 15

### Boiler Rivets—"Albany."

⅛, ¾, 11-16, and ¼ in. diam.5 50

### Boiler Makers' Tools.

Doty's Power Shears....net list
" Hand Lever Shears.net list
" Power Punch.....net list
" Hand Punch.....net list
Steel Screw Punch.....net list
Iron Screw Punch.....net list
Boiler Plate Rolls.....net list
Buffalo Forges & Blowers dis 20
Watson's " " net list
Spring Tube Expander....dis 15
Roller Tube Expander..net list
National Tube Cleaner...dis 20
Wire Flue Brushes.....net list
Anvils—"Peter Wright" 12½℔lb
Solid Box Vises.....net list

### Nuts, Bolts, etc.

Square & Hex. Nuts....7 off list
Washers.....6 off list
Machine Bolts.....dis 55
Bolt Ends.....dis 55
Boiler Patch Bolts.....net list

### Boiler Tubes.

"National" Standard Gauge 1 inch to 10 inch.....dis 37½
"National" Standard Gauge 11 inch to 15 inch.....dis 25
"National" Special Locomotive Tubes.....net list

## IRON AND STEEL.

### Flat Bar.

1½ to 4 by ⅜ to 1 inch..... 2 40
4¼ to 6 by ⅜ to 1 inch..... 2 50
1¾ to 6 by 1¼ to 1½ inch.... 2 80
1¾ & 1¾ by ⅜ to ¾..... 2 50
1 & 1¼ by ⅜ to ¾..... 2 60
⅝ ¾ and ⅞ by ⅜ to ½..... 2 80

### Round,

1 to 1⅞ inch..... 2 40
2 to 2¾..... 2 60
2¾ to 3¼..... 2 90
3¾ to 4..... 3 40
4¼ to 4½..... 3 90
4¾ to 5..... 4 10

### Square.

1 to 1⅞ inch..... 2 40
2 to 2¾..... 2 60
2¾ to 3¼..... 2 90
3¾ to 4..... 3 40
¾ to ⅞..... 2 50

### Heavy Band.

1¼ to 6 by ¼ and 5-16 inch. 2 60
1 to 1¾ by ¼ and 5-16 do 2 70
⅝ to ⅞ by ¼ and 5-16 do 2 90
⅝ to ⅞ by ⅜ and 5-16 do 3 40

### Half Oval and Half Round.

Wagon box iron ¾ and ⅞.. 4 00
1-10c per lb extra will be charged for cutting to specified lengths

### Light Band.

1¼ to 6 by ⅛ to 3-16..... 2 90

### Hoops.

1¼ to 2 , Nos 16 to 18..... 3 30
1¼ to 4 do 13 to 15..... 3 20
1-10 extra for each gauge lighter

### Sheet Iron.

No 22 to 24..... 4 30
No 25 to 26..... 4 50
No 27..... 4 70
No 28..... 5 10

### English Steel.

Best cast.....℔ lb 15½c
Extra cast..... 16¾c
Round machinery, cast 10c
Swaged, cast..... 18c
Best double shear..... 15½c
Blister, 1st quality.... 13c
Refined tool steel..... 16½c
Spring calking..... 7¼@7¾c
German steel, best.... 11c
2d quality..... 10c
3d quality..... 9c
Sheet cast steel, 1st quality..... 15½c
2d quality..... 14½c
3d quality..... 12½c

### American Steel.

Best brands of refined cast steel..... 12c
Crucible machinery.... 8c
Open-hearth ditto..... 5c
Hammer cast steel..... 9½c
Spring cast steel..... 7½c
Bessemer and open-hearth spring..... 5½c
Ditto plow..... 5½c
Steel boiler plate..... 6½@7c
Bessemer machinery..5 @6c
Spring and calking....7¼@7½c
Tire..... 5
Sleigh shoes..... 5

### Bessemer Steel Tire.

⅝ to 1 by 3-32..... 4½ ℔ lb
⅝ to 1 by ⅜ to 5-32..... 4½ ℔ lb
⅝ to 1 by 3-16 to ⅝..... 4½ ℔ lb

### Miscellaneous Cast Steel.

Auger and auger bit..... 8
Axle steel for wagons..... 8
Frog points and plates..... 9
Frog size bars..... 7½
Pick, plain..... 10
Mattock, beveled..... 9
Table cutlery..... 8½
Trap spring steel..... 9
Pike and cant hook..... 8½
Coal and granite..... 8½

## TINNER'S STOCK.

### Tin Plate,

10x14 IC charcoal.....$6 25
do IX do..... 8 25
12x12 IC do..... 6 00
do IX do..... 8 50
14x20 IC do..... 6 50
do IX do.....$6 25@7 50
DC, 12¼x17 do..... 6 00
DX 12¼x17 do..... 8 00
For each additional X add 2 00
IC 10x14} coke.....$5 75@5 50
IC 14x20}
IC 12x12 do.....5 00@5 75

### Tin.

Banca.....per lb. 28c
Straits..... " 25c
English..... " 25c
Spot Tin..... " 25c

### Solder.

½ and ½..... 16½c
Extra..... 15½c
No. 1..... 13½c

### Pat Planished Sheet Iron.

[A].....per lb 10½c
[B]..... 9¾c

| Nos | 10 | 15 | 21 | 25 |
|---|---|---|---|---|
| to | 14 | 20 | 24 | & 26 |
| Com | 3-60 | 3-80 | 4-00 | 4-20 |
| Char | 5-60 | 5-60 | 6-00 | 6-20 |

Sheets over 28 in. wide ¼c extra

### Zinc.

Sheet, cask..... 7½@ 7½
Sheet, open..... 8@ 8½

### Tinners' Tools & Machines.

Machines (P. S. & W.) list add 20
Tools (P. S. & W.).....add 5

## LEAD.

American, ℔ lb..... 5½c
Bar, ℔ lb..... 6½c net
Pipe, ℔ lb 7½c dis 10 per ct
Sheet, ℔ lb..8c dis 10 per ct
Tin-lined pipe ℔ lb 15c dis 10 pr ct
Shot Drop 7c; Buck.... 8c
Chilled Shot..... 8c

## COPPER.

Lake Ingot..... 18½c
Baltimore..... 17¼@18c
Arizona..... 18c

Sheathing Braziers Copper, Bolts, &c.

Brazier's Copper, ordinary sizes, 16 oz. per sq. foot, and over per lb.....30c
Brazier's Copper, ordinary sizes, under 16 oz. and over 12 oz. per sq foot, per lb. 32c
Brazier's Copper, 10 oz. and 12 oz. per sq. ft...per lb. 34c
Brazier's Copper lighter than 10 oz. per sq ft...per lb 36c
Circles less than 84 inches in diameter ... per lb. 33c
Circles 84 inches in diameter and over .....per lb. 30c
Segment and Pattern sheets per lb. 33c
Locomotive Fire Box sheets per lb. 30c
Sheathing Copper, over 12 oz. per sq. ft.....per lb. 28c
Bolt Copper ..... per lb. 30c
Copper Bottoms..per lb. 31@32c

No copper is Sheathing except 14x10 inches, and not to exceed 34 oz. to the sq. ft.

### Tinning.

14x18 ..... per sheet 6c
All other size sheets, 2½c per square foot For tinning both sides, double the above amount.

## SCRAP IRON AND OLD METAL

DEALER'S SELLING PRICES. Net Tons.

No. 1 wrought scrap..... $24
Sheet and hoop " ..... 10@11
Cast scrap, (No. 1 heavy). 19
Cast Scrap (Stove Plate). 12

OLD METALS.

Old copper per lb..... 15c
No. 1 H. Brass per lb..... 14
Heavy yellow Brass do..... 12
Light Brass per lb..... 12
Scrap Zinc per lb..... 6
Tea Lead per lb..... 3
Heavy Lead per lb..... 4

## BRASS.

Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 3c per lb.

High Brass.

All Nos not thinner than to No. 28, wider than 2 in. not wider than 14 inch.....30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in. inclusive..... 35c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in. inclusive.....38c
¼c per lb. advance on each No above Nos. 28 to 38, inclusive.
All Brass thinner than No. 8 is Platers' Brass at.....53c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 inches, in width wider than 2 inches .37c

Low Brass.

4c per lb. more than High Brass.
Gilding metal 8c per lb. more than High Brass.
Platers' or Gold Metal
In Bars.....48c
Sawed.....51c
Planed or Polished...54c

For Slitting.

Metal in width in. to ⅛ in. to No. 28, inclusive, 1c per lb advance.
Metal, in width 2 in. to 1 in, thinner than No. 28, 2c per lb. advance.
Metal, in width ⅛ in. to ¼ in. thinner than No. 28, 5c per lb. advance.
Metal ¼ in. in width and less, 10c per lb. advance.
Any of the above widths cut to particular lengths, add 7c per pound.

## PIPE, WROUGHT.

Standard Wrought Iron Lap Welded Steam and Gas Pipe.

| Inside Diameter. Inches. | Plain, Price Per Foot. | Galvan or Enameled Per Foot. | Outside Diameter Inches. | Weight Per Foot. |
|---|---|---|---|---|
| ⅛.. | 08 | | .40 | .24 |
| ¼.. | 08 | $0 11 | .54 | .42 |
| ⅜.. | 09 | 12 | .67 | .56 |
| ½.. | 11 | 15 | .84 | .85 |
| ¾.. | 13½ | 19 | 1.05 | 1.13 |
| 1 .. | 19 | 28 | 1.31 | 1.67 |
| 1¼.. | 27 | 40 | 1.66 | 2.26 |
| 1½.. | 33 | 47 | 1.90 | 2.69 |
| 2 .. | 46 | 64 | 2.37 | 3.66 |
| 2½.. | 75 | 1 00 | 2.87 | 5.77 |
| 3 .. | 95 | 1 30 | 3.50 | 7.55 |
| 3½.. | 1 25 | 1 70 | 4 00 | 9.05 |
| 4 .. | 1 50 | 2 05 | 4.50 | 10.73 |
| 4½.. | 1 75 | 2 40 | 5.00 | 12.49 |
| 5 .. | 2 25 | 3 00 | 5.56 | 14.56 |
| 6 .. | 2 75 | 4 00 | 6.62 | 18.76 |
| 7 .. | 3 75 | .... | 7.62 | 23.00 |
| 8 .. | 4 75 | .... | 8.62 | 28.00 |
| 9 .. | 6 50 | .... | 9 68 | 34.40 |
| 10 .. | 8 00 | .... | 10.75 | 40.64 |
| 12 .. | 12 00 | .... | | 54.65 |

Discount, plain, 55 per cent; galvanized, 52½ per cent.

### Gas and Steam Fitters' and Machinists' Supplies.

Gas and Steam Pipe—See Pipe Wrought.
Enameled Pipe.....dis 65
Artesian Well Casing....net list
Hydraulic Tubes.....net list
Malleable Iron Fittings..net list
Cast Iron Fittings.....dis. 55
Globe Valves.....dis. 50
Angle Valves.....dis. 45
Check Valves.....dis. 45
Safety Valves.....dis. 45
Eddy Gate Valves.....dis. 20
Steam Cocks.....dis. 45
Service Cocks.....dis. 45
Ball Gauge Cocks (net per dozen).....$15
Compression Gauge Cocks dis. 45
Miss. Gauge Cocks.....dis. 45
Register Gauge Cocks (net per dozen).....$15
Cylinder Cocks.....dis. 45
Air Cocks (net per dozen)...$2 75
Oil Cups.....dis. 45
Steam Gauges.....dis. 35
Water Gauges.....dis. 45
Scotch Glass Tubes.....dis. 00
Steam Whistles.....dis. 45
Iron Body Globe Valves..dis. 55
Iron Body Safety Valves..dis. 55
Iron Body Steam Cocks..dis. 55
Pipe Tools.....special
Globe, Angle and Check Valves (Powell's regrinding).....dis. 45
Guarantee "Jet Pumps" dis 40
Mack's Injectors.....dis. 25

### Babbitt Metal.

N. P. U.....℔ lb @9c
A. 28c., B. 25c., C. 15c.

## COAL,

WHOLESALE.

Wholesale f.o.b vessel at Cleveland:

Carbon Hill and Monday Creek.....$2 65
Massillon..... 2 85
Brier Hill..... 3 50@3 75
Pittsburgh..... 3 00
Salineville..... 2 50
Tuscarawas..... 2 25

RETAIL.—Delivered.

Massillon Lump.....$4 00
" Nut..... 3 75
Carbon Hill and Monday Creek, lump..... 3 75
Carbon Hill and Monday Creek, nut..... 3 50
75c less on cars by car load.
Anthracite Stove and Chestnut..... 7 15
Egg and grate..... 6 00

## GLASS.

(Per box of 50 feet)

SINGLE THICKNESS

| | |
|---|---|
| 6x8 to 10x15 | 7 50 |
| 11x14 to 15x24 | 8 50 |
| 16x24 to 20x28 | 9 75 |
| 15x34 to 24x30 | 10 75 |
| 26x28 to 24x36 | 11 50 |
| 26x36 to 26x44 | 18 |
| 26x46 to 30x50 | 14 00 |

DOUBLE THICKNESS

| | |
|---|---|
| 6x8 to 10x15 | 11 7 |
| 11x14 to 15x24 | 13 25 |
| 16x24 to 20x28 | 15 75 |
| 15x34 to 24x30 | 17 25 |
| 26x28 to 24x36 | 18 50 |
| 26x36 to 26x44 | 21 25 |
| 30x50 | 22 50 |
| 30x52 to 30x54 | 23 25 |
| 30x56 to 34x56 | 25 00 |
| 34x58 to 34x60 | 27 75 |
| 36x60 to 40x60 | 30 00 |

Dis 60 & 15 single, 60 & 20 double

## OILS & AXLE GREASE

**Pure Oils.** packages included

Sperm, winter bleached per gal..... 1 18@1 20
Elephant, winter bleached, per gal.... @ 70
Whale, winter bleached per gal..... 65@
Seal, winter bleached 80@ 85
Bank oil..... 48@ 51
Straits..... 50@ 53
"A" oil for tanner's use 35@ 40
Lard oil extra W S.... 1 03
do No 1 do..... 85
do No 2 do..... 70
Tallow oil..... 65@ 72
Neatsfoot oil pure.... 1 05
do No 1..... 90
Linseed oil, raw..... 57
Linseed oil boiled..... 60
Cotton seed oil white.. 64@ 66
do do yellow 60@ 63
Carbon oil Ohio legal test..... 9½@11½
West Virginia lubricating 28 deg..... @ 29
Pure Mecca..... 55@ 50
Paraffine oil winter pressed gray 25 ...
do io do 25@ 30
Machinery..... 40
Engine..... 50
Miners' oil..... 40@45
Drilling oil..... 40

### Hides and Leather.

Prime cured hides, 7¾
Green hides..... 6@6¼
Bull, scrubby, badly scored or damaged, cured, two-thirds price.
Prime dry hides..... 13@14
Horse hides, green $1 75@2 00
Horse hides, dry..... $2 00@2 25
Prime cured veal calf. 12¼
Prime Deacon Skins, salted 65@70
Pelts, wool on..... 32@34
Fresh slaughter sheep 30@$1 50
Fresh slaughter lambs 50@60
Green calf skins..... 13
Hemlock rough..... 23@24
Oak harness..... 34@38
Oak sole..... 37@40
Union harness..... 31@34

## Cleveland Business Directory.

**Assayers and Analytical Chemists.**

JUDSON, W. E, Ana ytical Chemist, 8 Cushing Block.

**Bolt and Nut Works.**

HOTCHKISS & GAYLORD, manuf'rs. Machine, Plow & Elevator Bolts, Coach Screws.

**Boiler Makers.**

SMITH & TEACHOUT — (Established 1857.) Boiler, Tanks, Stills etc. 439 Broadway.

**Bridge Builders.**

BUCKEYE BRIDGE AND BOILER WORKS mfrs of Arch & Truss Bridges, Boiler Tanks and Oil Stills. Bet. Wasson St. and Case Ave.

**Coal and Iron Exchange.**

JACKSON IRON CO. Iron Ore and Pig Iron. Rooms 8 and 9. Fayette Brown, Gen. Agent.

RHODES & CO. Coal, Iron Ore an Pig Iron. Rooms 1 and 2.

**Carriage Blacksmith.**

STRIEBEL, CHAS. manfac'r. of Carriages and Wagons and platform trucks. Horse shoeing and general blacksmithing .93 Woodland ave.

**Carriage Bolts.**

THE COLWELL & COLLINS NORWAY BOLT CO., manufacturers of Philadelphia Carriage and Tire Bolts.

**Church and School Furnture.**

FAULHABER, GEO. manufacturer of School and Church Furniture. Fine Hard Wood work a specialty. 203 Ontario Street.

**Custom Boots and Shoes.**

ROONEY, JOHN manufacturer of hand-made Boots & Shoes, custom made and warranted 177 Ontario Street.

**Carriage Repository.**

GREENE'S, J. O., Carriage Repository, 408 Superior street and 52, 54 & 56 Rockwell street, dealer in Fine Carriages. Repair shop in connection.

SLATER, G. A., Carriage dealer, sells the best work for the lowest price. A fine assortment always on hand. Repository 365 Euclid Avenue.

**Coal and Pig Iron.**

ANDREWS, HITCHCOCK & CO., Briar Hill Coal and Pig Iron. 122 Water Street.

**Distillers.**

BLOCH, S. H. & E., Distillers, and wholesale dealers in Kentucky Whiskies. 66 Water St.

**Electrical,**

ELECTRIC SUPPLY CO. manfrs and dealers in Electric Burglar Alarms, Annunciators, Cell Bells and Batteries. Telephone lines built and repaired. 145 Seneca Street.

**Fresco Artists.**

KEMMER & KUSHMAN DECORATIVE CO., Fresco Artists, Fine Modern Wall Papers. 838 Euclid ave.

**Foundries.**

BOWLER & CO., Car Wheels, Patent Chilled Frogs, and all kinds of castings. 9 Winter.

CLEVELAND MALLEABLE IRON CO., manufacturers Malleable Iron Castins.

LAKE SHORE FOUNDRY, Water and Gas Pipe, Light and Heavy Castings. Alabama st.

TAYLOR & BOGGIS, successors to H. & H. F. Taylor, Iron Founders, 65 to 73 Central Way.

VIADUCT FOUNDRY COM'Y, Aenis, Carlin & Strangward manfrs of Machinery Castings Fine Light Castings a Specialty. Office & Works 11 13 15 and 17 Detroit Strert, near Center.

FITZSIMONS WM. & SON, Rolling Mill and Machinery castings. Rolls a Specialty. No. 435 Broadway.

**File and Saw Works.**

PARKIN, W. H & CO., Hand-cut Files and Rasps, dealers in Disston's saws, 11 So. Water

**Grindstones.**

OHIO GRINDSTONE CO. manufacturers of and dealers in Grindstones. 127 Superior st.

**Hotels.**

FOREST CITY HOUSE, cor. Public Square and Superior st., Terrill & Ingersoll, Props.

KENNARD HOUSE, D. McClasky, Prop.

NEW ENGLAND HOTEL, Water st., W. W. Wolcott, Prop. Refitted and refurnished.

STRIEBINGER HOUSE, between Ontario and Seneca sts. $2.00 per day. Hawley & Langton

CITY HOTEL, Seneca street. H. B. West, proprietor. $1.50 per day.

**Hides, Pelts and Leather.**

DENNISON BROS., dealers in Hides, Pelts, Furs and Tallow. 48 and 50 River street.

**Hardwood Lumber.**

MARTIN, J. T. dealer in Hardwood Lumber, Stone's Levee, near Central Way.

**Lumber.**

WOODS, PERRY & CO., manufacturers and dealers in Lumber, Lath, etc., 5 Carter st.

FISHER, WILSON & CO., wholesale lumber dealers (pine & hard wood), rough and dressed lumber, timber, lath, shingles, etc. 47 Central Way

KRAUSE, C. A., & SON, wholesale and retail dealers in lumber. Yards cor. Superior and Wason and 281 Merwin streets.

## Cleveland Business Directory.

**Flue Cleaner.**

CLEVELAND FLUE CLEANER M'F'G. CO. manufacturer of Aitchison & Doolittle's Patent Steam Flue Cleaner, 22 & 24 Power Block.

**Hardware and Iron.**

BINGHAM, WM. & CO., Hardware, Iron, Nails and Metals, 148 and 150 Water street.

CLEVELAND ROLLING MILL CO., manuf'rs. of Steel and Iron Wire and Steel Tire.

WORTHINGTON, GEO. & CO., Hardware and Dealers in Metals. Water street.

**Lime Manufacturers.**

RUSSELL LIME CO., manufacturers of White Lime; also dealers in Plaster, Cement, etc. 85 Elm street.

**Machinery and Boilers.**

CLEVELAND STEAM FURNACE CO., Engines and Boilers, cor. Detroit and Center sts.

KRITCH, K. E. Metal Pattern Maker. Small machinery repaired. Lawn Mower sharpening a specialty. 42 South Water Street.

**Machinery Depot.**

CLEVELAND MACHINERY DEPOT. (now National Machinery Depot.) The largest stock of New and Second-hand Engines, Boilers and Machinists' Tools. Shop and Warehouse corner Bond and Superior streets.

**Mercantile Agency.**

THE MERCANTILE AGENCY. R. G. Dun & Co. proprietors. 121 Superior street.

**Oil Manufacturers.**

AMERICAN LUBRICATING OIL CO., manufacturers of lubricating oils. 23 Euclid ave.

**Paints and Oils.**

MASTERS, J. N. jobber in Paints, Oils, Varnishes. Brushes, 34 Prospect st.

**Pattern and Model Makers.**

WHITTINGHAM, J. & C., Metal Pattern and Model makers. 52 Canal Street.

**STAIR BUILDER.**

PFEIL, CHAS. Stair Builder; Hard Wood Mantles and Office Railing. Works, 49 & 51 Canal street, Cleveland, Ohio.

JOHNSON & PURSER, Stair Builders. and manuf'rs of Mantels, Odd Pieces of Furniture, &c. 30 West street, up stairs.

**Steel Stamps and Stencils.**

FLEHARTY, J. H. & CO., Rubber Stamps, Seals, Stencils. 197 Superior street.

**Tanners.**

GAENSSLEN BROS., Tanners, and dealers in leather, oil and shoe findings. 80 Water-st.

**Trunks and Valices.**

FABER, J. manuf. Trunk, Traveling Bags and Ladies' Fine Satchels. Sample Trunks and Cases a Specialty. 56 Public Square.

**Vessel Agents.**

WEBB, H. J. & CO., Ship Brokers and Vessel agents. 17 & 18 Board of Trade Building. 122 Water Street.

**Wood Carving.**

HERKOMMER, J., Carver and Ornamenter in Composition. 225 Erie street.

## Business Directory.

**Akron, O.**

AKRON IRON CO., manufacture best Common, Refined and Charcoal Iron.

CASCADE HOUSE, cor. Mill and Summit sts., near Depot. J. Downie, Prop.

MCNEIL, J. C., Steam Boilers, Heavy Sheet Iron Work. Repairing promptly executed.

PERKINS, C. E., dealer in Agricultural Implements, machinery, and Manufacturers' Ag'nt

TAPLIN, RICE & CO., manuf'rs. of Stoves and Hollow Ware, dealers in Tinners' Stock, etc.

WEBSTER, CAMP & LANE MACHINE CO., Founders and Machinists, 12 Main street.

**Alliance, O.**

ARLINGTON HOUSE, cor. Main and Liberty Streets. Centrally located. Sample Room for Commercial Travellers. H. S. Adams, proprietor

MCFARLAND, J. W. Engine and Machine Builder, and General Machine Jobbing

**Columbus, O.**

PAT. ADJUSTABLE WINDOW CURTAIN Cornice, manufactured by Strader's Curtain Cornice Works.

ROYCE & PULLING manufrs of Patent Steam Pumps for all purposes. Store room 30 High street. Works Nos. 5 and 7 Scioto street.

COLUMBUS MACHINE CO. manfrs. of Blowing, Stationary and Portable Engines, Brass and Iron Castings. West End Nat. Road Bridge.

REYNOLDS BROS., manufacturers of hand-cut Files and Rasps. Old files re-cut. Send for Price List.

CITY BOILER WORKS, manfrs of Stationary, Portable and Locomotive Steam Boilers. All work warranted. Borger Bros. & Co.

MURRAY, HAYDEN & CO., manfrs of Malleable Iron. Cor. Randolph & West streets.

## Business Directory.

**Canton, O.**

DIEBOLD SAFE & LOCK CO., manuf'rs. Safes, Locks, Bank and Safe Deposit Works.

NOVELTY IRON WORKS, Mill work, Shafting, engines, Imperial job printing press, etc

NEW AMERICAN HOUSE, Canton. Fred. Hipp, Prop.

EBERSOLE & KAILEY, Machine and Jobbing Shops. Gearing for Patterns or Machinery a specialty. Models of all kinds made & repaired.

**Cuyahoga Falls, O.**

THOMAS BROTHERS, manfrs of Ohio Stone Ware. Cuyahoga Falls Stone Ware Factory, cor. Main and Broad streets,

TURNER, VAUGHN & TAYLOR, manufacture engines, presses and grinding machinery for clay; also paper, chain, wire and flour mill machinery. Send for Circulars and price list.

SNYDER, H. wholesale manufacturer of Sash, Doors, Blinds, &c. Send for Price Lists.

THE CUYAHOGA FORGE AND IRON CO., manfrs. of every description Car, Truck and Driving Axles, Forging, Shafting, &c.

**Canal Dover, O.**

HECKMAN, E., manufr. and dealer in harness leather, upper, kipp and calf. Also, manufacturer & dealer in prime English Dairy cheese. Highest market cash price paid for hides.

**Garrettsville, O.**

UDALL & NILES Foundry and Machine Shop. General repairing and jobbing on short notice

**Geneva, O.**

THE ENTERPRISE MACHINE CO., L. L. Crane, Pres't, manfrs of Machinists' Tools and Machinery. Gear Cutting a specialty.

**Lima, O.**

LIMA HOUSE, centrally located; telegraph office in the house. J. Goldsmith, Prop.

**Massillon, O.**

TREMONT HOUSE, Jas. M. Clark, proprietor. Terms $1.50 per day. Good sample room for Commercial Travellers.

CITY CARRIAGE WORKS, P. H. Young, prop. manfact'r of Carriages, Phætons and Spring Wagons. Work warranted. Cor. Tremont & Erie.

**Painesville, O.**

NORTH AMERICAN CUTLERY CO., m'fr's of Steel Shears and Scissors—best quality.

**Ravenna, O.**

THOMPSON, T. F., dealer in Agricultural Implements, farm machinery, hardware, seeds, fertilizers, &c. Cor. Main and Prospect sts.

BALDWIN, D. L. & SON, Contractors & Builders and manfrs of all kinds of Moulding, flooring, siding, &c. Rip, Band and Scroll Sawing.

**Steubenville, O.**

DORRANCE, D. W., Tool Works, manufacturer of hand-made miners' and stone-cutters' Tools Promp attention given to mail orders.

**Sandusky, O.**

SANDUSKY WHEEL CO. manfrs. of Sarven Patent Wheels. Carriage Bodies and Seats, Plain Wood Hub Wheels, Banded Hub Wheels, Jacobs' Patent Neck Yokes.

FULTON MACHINE WORKS & FOUNDRY, Barney & Kirby, proprietors, manfrs. of Stationary and Portable Engines and Boilers, Rolling Mill Machinery, Circular Saw Mills, etc.

**Toledo, O.**

BAKER, HERBERT, Machine Shop and Iron Foundry. 98 and 100 Erie street.

TOLEDO FOUNDRY AND MACHINE CO. builders of Steam Engines, Circular Saw Mills and all kinds machinery. Water St., cor. Cherry

RUSSELL IRON WORKS, manfrs. of Architectural Iron Work, castings, pulleys, shafting and steam bending machinery. Cor. Water and Lagrange streets.

STANDARD SAW WORKS, H. Bartley, manufacturer and dealer in Saws of every description. All kinds of Springs made from Sheet Steel. Reaper, Hay Knives Truss Springs, &c. made to order. 92 St. Clair Street.

UNION Wooden Ware Manufacturing Co. manufacture Sewing machines, washboards, children's wagons, carts, wheelbarrows, sleds, kitchen wooden ware, &c.

HEPBURN BROTHERS, proprie. Union Boat Works. Boats of all kinds made to order. For sale or rent. Water Street foot of Cherry.

**Youngstown, O.**

BELL, EDWIN & SON, manuf. of Nail Kegs, Pat. coiled hoops, slack barrel and keg heading and oil barrel stock.

DINGLEDY, G. H. dealer in rough and dressed Lumber, Shingles and Lath.

MORTON HOUSE, formerly Maitland House, James Morton, Prop.

TOD HOUSE, cor. Diamond and Market streets. Henkel & Bowman, Props.

**Zanesville, O.**

KIRK HOUSE, William Kirk, proprietor. $1.50 per day.

**Titusville, Pa.**

FOSTER & MCKAY, dealers in boilers and engines, tubing, casing, old iron, rope, and all kinds of metals. Washington street, nr. Railroad.

**Rochester, Pa,**

OLIVE STOVE WORKS, (limited) manufacturers of Stoves and Hollow Ware.

## Business Directory.

**Erie, Pa.**

ERIE STEAM BENDING WORKS. H. G. Fink, prop'r, manufacturer of Bent Felloes, poles, snafts, bob runners, etc. Cor. 12th & Cherry.

GUNNISON, A. B., wholesale manufacturer of Wood Pumps. 233 East Twenty-Second St.

BALL ENGINE CO., limited, manufacturers of Automatic Engines of 15 to 30 horse power

NOBLE SEWING MACHINE CO. manfrs of the New Noble Sewing Machine. Send for circulars and prices.

A. B. FEIGEMAKER & CO. Church Organ builders. Descriptive catalogue furnished on application.

**Meadville, Pa.**

CURRY & CO. general jobbers in Castings of al kinds.

**Oil City, Pa.**

REID, JOS. Machinist, steam engine and pump repairing. Brass and sron castings, light and heavy, made on short notice.

**Sandy Lake, Pa.**

EBERMANN, W. S. & SONS, manfrs. of the celebrated Ebermann Boiler Feeder. Send for Circulars and Price List.

**Pittsburgh, Pa.**

PRINTING PRESSES. W. A. Bunting, manufacturers' agent. Printers supplies, type, cards. 42½ Sixth Street. [Up stairs.]

BAIR & GAZZAM, practical machinists; gear cutting a specialty. Rice's Feed Water and Heater. 17 Wood street, corner First Avenue.

**Wheeling, W. Va.**

EXCELSIOR MACHINE WORKS, Redman & Co., general machinists and manufacturers of Marine and Stationary Engines, Hangers, Pullies, Shafting, &c. Cor. 18th & Chapline streets.

**Louisville, Ky,**

HAIGHT, ROBERT. Gold, Silver and Nickel Plating and Brass Finishing Shop. Car Trimmings and Steamboat work a specialty. 1 West Market street

**Union City, Ind.**

LAMBERT, J. W. & CO., mfrs of fork, rake, hoe and broom handles; spokes, hubs, whiffletrees, yokes, plow-rounds, &c. Correspondence solicited.

**Olean, N. Y.**

MYRICK BROS. & CO., manufact'rs Engines and Boilers, oil drilling tools, rig irons, etc.

**Rochester, N. Y.**

GOWE, JNO. N., mfrs. of Specialties, such as Machine forging, bridge bolts and trusses, railroad switches, spike, mall, chisels, &c.

ELEVATORS for Hotels, Factories and Private Houses. J. S. GRAHAM & CO.

KELLY, PETER, Boiler Maker, Mill street, cor. Furnace. Sheet iron work made to order.

WOOD-WORKING MACHINERY. Send for Catalogue. J. S. GRAHAM & CO.

KINGSBURY, G. J., Cracker and Oven Machinery Works. Shawmut Building, Mill St,

WISEMAN, Albine, manufacturer of all kinds of Shoemakers' Tools. 117 North Water St.

ULSCHT & LINN mfrs of Wood Lathes, Engraving Machinery, &c 131 N. Water street

RAZOR STROPS. Sole mfrs. of all kinds of Razor Strops. Ulscht, Linn & Co. 131 N. Water

**Buffalo, N. Y.**

SANDS, PAUL, Marine and Stationary Steam Engine Works mfr. of drilling machines, foot and power lathes. 70 Columbia street.

EMPIRE STATE MF'G CO., O. F. Swift, prop'r, manfr of Fluters, Sad Irons, Spun Copper & Half Copper Tea Kettles. Washington, cor. Ohio

WHITE, L. & I. J. manfrs of Coopers' Tools, Carpenters Tools, Draw Shaves, Cleavers Choppers, Ship Tools, &c. 312 Exchange street.

THE BUFFALO NUT AND BOLT CO. [Limited.] Manufrs. of Hot Pressed Nuts, Bolts, Washers, Rivets, &c. No. 226 Ohio Street.

**Rheims, N. Y.**

GREAT WESTERN CHAMPAGNE. Finest made in America. Equal to best imported. Has taken highest awards everywhere, and is used all over the Continent. Try a case, and you will have no other. Pleasant Valley Wine Co., Rheims, N. Y.

**Brattleboro', Vt,**

A JOY FOREVER!

**ESTEY ORGANS**

Manufactured by

**J. ESTEY & CO.,**

Brattleboro', Vt.

(Catalogue free on application.)

CLEVELAND ELECTROTYPE FOUNDRY 55 FRANKFORT -STREET- CLEVELAND, O. 55

# Smith & Curtiss,

JOBBERS OF

# TEAS,

## COFFEES AND SPICES

ALSO PROPRIETORS OF THE

CLEVELAND

## Coffee and Spice Mills,

107 & 109 Bank Street,

Cleveland, O.

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**JUDSON'S PATENTED**
SECTIONAL
**Assay Furnaces**
AND APPLIANCES.
**Model Furnace for 1881,**
All steel, light and durable, with Revolving Grate, etc. Also
**Judson's Practical Stoking Attachment**
Guaranteed to feed coal, coke or charcoal without choking the draft.
Manufactured only by the patentee,
**W. E. JUDSON,**
Cleveland, O

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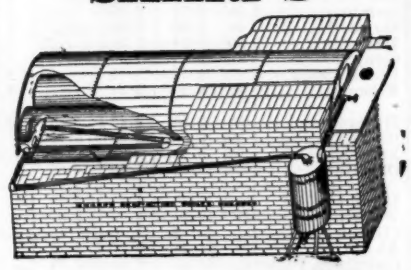
SHARP'S



# SELF-ACTING BOILER CLEANER.

Patented November 23, 1880.
THOS. SHARP & CO.
SALEM, OHIO.
☞ Send for Circular and Price List.
[Mention this paper.]

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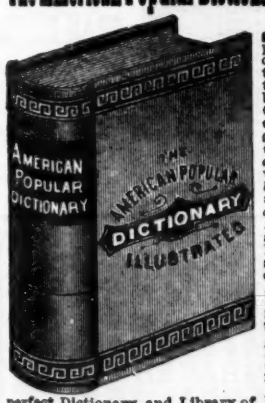
**The American Popular Dictionary. $1 Only.**




This useful and elegant volume is a complete Library and Encyclopedia, as well as the best Dictionary in the world — superbly bound in Cloth and Gilt. *It contains every word of the English language, with its true meaning, derivation, spelling and pronunciation,* and a vast amount of *absolutely necessary information upon Science, Mythology, Biography, American History, Law, etc.,* being a perfect LIBRARY OF REFERENCE. Webster's Dictionary costs $9.00, and the American Popular Dictionary costs only $1.00. "Worth ten times the money."—*N. Y. Times.* "We have never seen its equal, either in price, finish or contents."—*Chris. Advocate.* "A perfect Dictionary and Library of Reference."—*Leslie's Illus. News,* N. Y. One copy of the American Popular Dictionary Illustrated, the greatest and best book ever published, postpaid, to any address on receipt of only $1, ☞ Entire satisfaction guaranteed. Two copies postpaid for $2. A GRAND HOLIDAY PRESENT. *Order at once.* This offer good for 60 days only *and may never appear again.* 5,000 copies sold in two months! Agents Wanted. H. C. DEAN, Pub'r, 89 Metropolitan Block, Chicago, Ill.

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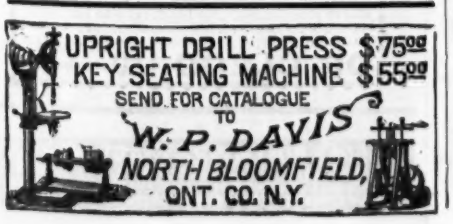


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C. S. BARRETT, President. P. ARNOLD, Superintendent.

# Dover Fire Brick Co.,

MANUFACTURERS OF

## Fire Brick of all Shapes and Sizes,

— AND —

**Shippers of Fine Ground Fire Clay.**

Office--101½ Water Street, Cleveland.

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**Truck Hubs.**

Black Birch Carriage, Wagon and
**TRUCK HUBS.**
Sizes from 3½x6½ to 18x22.
R. M. WHITNEY,
OLEAN, Cattaragus Co., N. Y.

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**Practical Lithographer.**

**CHAS. F. SCHMIDT,**
PRACTICAL
**Lithographer, Engraver**
**AND PRINTER,**
Room 12 Bratenahl's Block, cor. Superior and South Water Streets, Cleveland, O.
Correspondence solicited from Manufacturers.

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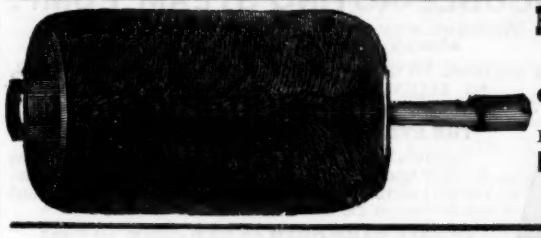

**Patent Steel Tube and Flue Brush.**
**Best in the Market.**
**Made any size required.**
**Combines the properties of a Scraper and Brush.**
Full stock always on hand.
**L. B. Flanders Machine Works**
1025 Hamilton street,
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## JOSEPH M. DOWNING.

UNION TUBE WORKS, NEWCASTLE, PA.

MANUFACTURER OF

**LAP WELDED BOILER TUBES**

FROM BEST AMERICAN

**Charcoal Hammered Iron.**

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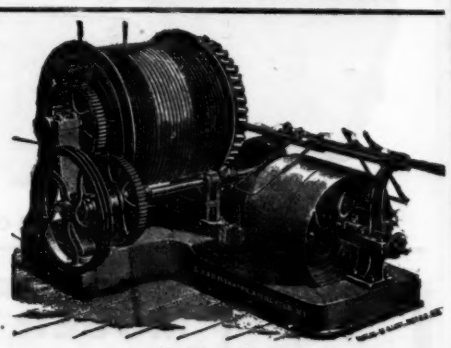
**Freight and Passenger**

# Elevators.

L. S. GRAVES & SON,
Cor. Center and Frank Streets,
ROCHESTER, N. Y.



No. 3 Screw Machine.

Send for our Catalogue.

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EDWARD C. POST,
Successor to Smith & Post,
Manufacturer of
**Hydraulic and Steam Power Passenger and Freight**

# ELEVATORS,

**HAND ELEVATORS, Etc., Etc.**

**Shafting, Pulleys and Hangers, Etc.**

Send for Circulars and Price List.
CORNER ST. CLAIR & WASHINGTON STREETS,
TOLEDO, OHIO.

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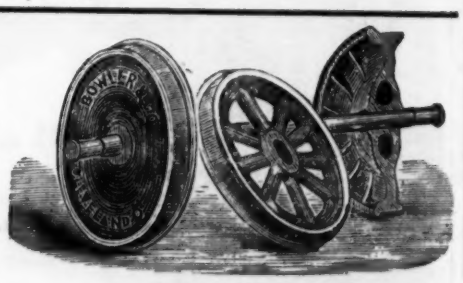
# Cleveland Foundry.

**CASTINGS**
For Machinery and Rolling Mills.
**Car Wheels**
all sizes and kinds, with and without Axles.
**Chilled Faced R. R. Frogs.**
STREET RAILROAD TURNOUT
Nos. 9, 11, and 13 Winter Street.
**BOWLER & CO.**

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G. M. HEARD & CO.

# Gold, Silver & Nickel Platers

**109 Ontario Street.**
CLEVELAND, O.

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B. F. Roberts,

# BOILER MAKER,

**And Sheet Iron Worker.**
BRIDGE STREET, SPRINGFIELD, OHIO
Special attention paid to taking out and Piecing Portable Flues.
☞ Orders by mail to B. F. Roberts, Springfield, Ohio, promptly attended to.

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E. F. ENSIGN,
JOBBER OF

# Agricultural Implements,

WAGONS, FERTILIZERS, SEEDS, &C.
**The Empire Grain and Fertilizer Drill and Twine Binding Harvesters Specialties.**
134 ST CLAIR STREET, CLEVELAND, O

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**Springfield Brass Foundry.**
**Pattern and Model Work a Specialty.**
Castings done in White Metal, Brass, Zinc, Type Metal, Pig Lead, Pig Tin, Bar Lead, Bar Tin, Antimony, Copper, Spelter, &c., &c.
**Cash paid for Old Brass and Copper**
McLAUGHLIN & SHILLING.
68 South Limestone Street,
SPRINGFIELD, O.

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**PURE PREMIUM BONE.**

The tried and never failing Fertilizer in all grains and grass crops. It has proved its value as such by years of actual use all over the world. Circulars and Price List free. Address all letters pertaining to the purchase of Premium Bone, or the sale of bones, to **Excelsior Fertilizer Works,** Salem, Columbiana County Ohio.

## TRAVELERS' REGISTER.

### Lake Shore & Michigan Southern.

Trains marked with a * are the only trains that arrive and depart in this city on Sundays.

EAST BOUND TRAINS.

| | Arrive. | Depart. |
|---|---|---|
| No. 20 Limited Express | *1:35 A.M | *1.50 A.M |
| No. 6 Atlantic Express | *7:05 | *7 30 |
| No. 10 Buffalo Accom | 11:00 | 11.15 |
| No. 8 C. & St. L. Exp | *2:25 P.M | *2.55 P.M |
| No. 4 Special N. Y. Exp | 10:10 | 10.35 |
| No. 2 San. Div. Accom. | 10:12 | |
| No. 12 Conneaut Accom. | | 4.50 |
| Nottigham Accommodation (Sundays only) | 10.05 A.M<br>4.45 P.M | 9.00 A.M<br>2.15 P.M |
| No. 18 Elyria Accom. | 8.50 A.M | |

WEST BOUND TRAINS.

| | Arrive. | Depart. |
|---|---|---|
| No. 13 Mich. Accom. | | 6.40 A.M |
| No. 1 Special Chicago Ex. | *6 35 A.M | 7.00 |
| No. 3 Toledo Express | 1.25 P.M | 3.30 P.M |
| No. 21 St. Louis Express | *1.40 | *2.05 |
| No. 5 Pacific Express | *7.05 | *7.35 |
| No. 11 Conneaut Accom. | 8.40 A.M | |
| No. 19 Pt. Clinton Accom. | | 5.00 |
| No. 7 Michigan Exp. | *2.50 A.M | *3.05 A.M |
| No. 17 N.Y. & Chi. Ex. | 11.43 P.M | 11.53 P.M |

### Cleveland, Columbus, Cincinnati & Indianapolis.

ARRIVALS.

| | |
|---|---|
| No. 2 Col. & Cin. & Ind'pous Ex. | *7 10 A.M |
| No. 8 C. T.V. & W. & Clev. Accom | 10 30 |
| No. 12 St. Louis & New York Exp. | *3 00 P.M |
| No. 4 Special Cin. & New York Exp. | *3 40 |
| No. 10 Wheeling & Cleveland Exp. | 8 30 |
| No. 6 Indianapolis & Columbus Exp. | 10 20 |

DEPARTURES.

| | |
|---|---|
| No. 1 Cincinnati & Columbus Exp. | 8 00 A.M |
| No. 11 Cleve, Indianap. & Wheel'g Ex. | 7 10 |
| No. 3 St. Louis & Cincinnati Ex. | ‡2 00 P.M |
| No. 5 Night Express, | *7 25 |
| No. 7 C.T.V. & W. & Col. Accom | 4 00 |

‡This train runs daily to Indianapolis and St. Louis, and daily, except Sunday, to Cincinnati.

### Cleveland, Tuscarawas Valley & Wheeling.

ARRIVALS.

| | |
|---|---|
| No. 4 Wheeling & Cleve'd Exp. | 8 25 P.M |
| No. 2 Uhrichsville Accom. | 10 30 A.M |

DEPARTURES.

| | |
|---|---|
| No. 1 Wheeling & Cleve'd Exp. | 7 15 A.M |
| No. 3 Uhrichsville Accom. | 4 00 P.M |

### New York, Pennsylvania & Ohio.

ARRIVALS.

| | |
|---|---|
| No. 7 Mahoning Valley Accommo. | 10 55 A.M |
| No. 3 New York Express, | *7 00 P.M |
| No. 1 New York Express, | 6 50 A.M |
| No. 3 Pittsburgh Express, | *7 00 P.M |
| No. 5 Pittsburgh Express, | 3 10 |
| New York Express | 3 10 |
| No. 9 Youngstown and Pitts. Local | 10 15 |

DEPARTURES.

| | |
|---|---|
| No. 12 New York Express, | *7 10 A.M |
| No. 4 Youngstown Local, | 11 15 |
| No. 8 Mahoning Accommodation, | 4 25 P.M |
| No. 2 New York Express, | 10 45 |
| No. 12 Pittsburgh Express, | *7 10 A.M |
| No. 6 Pittsburgh & Main Line Express | 2 30 P.M |

### Cleveland & Pittsburgh.

| | DEPARTURES. | ARRIVE. |
|---|---|---|
| Mail | 8 00 A.M | 1 15 P.M |
| Express | 1 25 P.M | 7 30 |
| Alliance Accommodation | 3 45 | 10 10 A.M |
| Ravenna Accommodation | 5 35 | 8 35 |
| Night Express | ‡11 40 P.M | 6 30 A.M |

‡ Night Express runs daily, except Saturday, by way of Wellsville, and on Saturday by way of Alliance.

### Valley Railway.

| ARRIVE. | | DEPARTURES. | |
|---|---|---|---|
| No. 2 Accom. | 10 15 A.M | No. 1 Mail | 8 15 A.M |
| No. 6 Express | 1 35 P.M | No. 3 Accom. | 2 20 P.M |
| No. 4 Mail | 6 30 P.M | No. 5 Exp. | 6 05 |

Trains leave from Depot foot of South Water Street.

Special trains leave on Sunday at 8.30 A. M. and 4.20 P. M., arriving at Cleveland at 10 A. M. and 6.25 P. M.

### Connotton Valley Railway.

| Arrive. | | Depart. | |
|---|---|---|---|
| No. 1 | 10 05 A.M | No. 4 | 4 00 P.M |
| No. 3 | 7 15 P.M | No. 2 | 8 10 A.M |

All trains arrive and leave depot corner Commercial and Fifth Streets

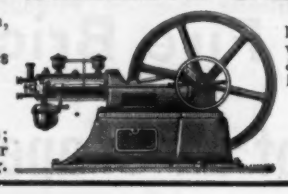

## NEW OTTO SILENT GAS ENGINE.

Working without Boiler, Steam, Coal, Ashes or Attendance.

Started instantly by a Match, it gives full power immediately.

When stopped all expense ceases.

No explosions; no fires nor cinders; no gauges; no pumps; no engineer or other attendant while running.



Unsurpassed in every respect for hoisting in warehouses, printing, ventilating, running small shops, &c., 2, 4 and 7 H.P. and upwards. Built by

Schleicher, Schumm & Co., PHILADELPHIA.

ALBERT FISHER, Agent for Cleveland. 48 Merwin Street, Cleveland, O.

## WEST POINT BOILER WORKS.

ESTABLISHED 1835.

Removed from 13 Water to Corner 23d and Smallman Streets, PITTSBURGH, PA.

FIRST PREMIUM STEAM

# BOILERS,

Stills, Tanks and Sheet Iron Work

of all descriptions made to order on short notice. Have on hand a large stock

**New and Good Second Hand Boilers.**

REPAIRING DONE PROMPTLY.

R. MUNROE.

## THE NEW PULSOMETER

REQUIRES BUT LITTLE STEAM TO OPERATE IT. PUMPS ALMOST ANYTHING.

Is a real substantial and efficient

DOUBLE-ACTING STEAM PUMP,

Without any mechanical arrangement to absorb power, or get out of order.

NO PISTONS, NO GLANDS, NO CONNECTING RODS, NO CAMS, NO ECCENTRICS, NO STUFFING BOXES, NO FLY WHEELS, NO CRANKS, NO EXHAUST, NO OIL.

THE STEAM IS MADE TO DO DOUBLE DUTY.

Its operation is sustained by steam pressure, brought directly upon the liquid (a cushion of air only intervening) as the forcing elements, while its subsequent condensation furnishes the lifting power.

IT WILL SAVE OVER 50 PER CENT. IN FUEL.

It never gets rusty or deranged, requires no oiling or packing, and requiring no special care, will, on a constant suction, work day and night without attendance—in fact, as long as steam and water are supplied.

*It will raise, in combination with water, from 25 to 50 per cent. of mud, sand, gravel, pulp, etc.*

From the peculiar simplicity of construction and operation, its compact form, wonderful efficiency and adaptability, great economy and durability, the NEW PULSOMETER has great advantage over all other systems of water elevation.

Every part that sustains any wear is now so constructed that it can be easily removed when worn, and replaced with but trifling cost, and when thus replaced will be as good as new.

Descriptive book with prices and testimonials mailed upon application to

PULSOMETER STEAM PUMP CO.

83 JOHN ST., NEW YORK, or to

CHICAGO OFFICE:

193 Lake St., Frank Gray, Manager.

BOSTON OFFICE:

33 Charlestown Street, S. B. Everett, Manager.


## Cleveland, Akron and Columbus RAILROAD.

Trains leave and arrive daily (Sundays excepted) at the points named below.

GOING SOUTH.

| STATIONS. February 20, '82. | Miles | Mail and Expr 2 | Thro' Pass'gr 4 | Accom 6 | Accom 8 |
|---|---|---|---|---|---|
| | | A.M. | P.M. | P.M. | |
| Cleveland | | 8.00 | 1.50 | 3.45 | |
| Hudson (1) | 0 | 9.15 | 3.00 | 5.05 | |
| Cuyahoga Falls | 8 | 9.32 | 3.18 | 5.23 | |
| Akron (2) | 14 | 9.47 | 3.33 | 5.36<br>5.50 | |
| Clinton | 27 | 10.17 | 4 04 | 6.23 | |
| Warwick | 28 | 10.23 | 4.10 | 6 31 | |
| Marshallville | 33 | 10.35 | 4.23 | 6.45 | |
| Orrville (4) | 39 | 10.51 | 4.43 | 7.03 | |
| Fredricksburg | 52 | 11.22 | 5.16 | 7.37 | |
| Holmesville | 56 | 11.34 | 5 28 | 7.52 | A.M. |
| Millersburg | 62 | 11 48 | 5.41 | 8.05 | 5.40 |
| | | P.M. | | | |
| Killbuck | 68 | 12.02 | 5.55 | | 5.54 |
| Black Creek | 74 | 12.16 | 6.09 | | 6.08 |
| Gann | 82 | 12.41 | 6.35 | | 6.33<br>6.53 |
| Danville | 86 | 12 55 | 6.49 | | 7 07 |
| Howard | 91 | 1.05 | 6.59 | | 7.18 |
| Gambier | 95 | 1.15 | 7.11 | | 7.29 |
| Mt. Vernon (5) | 100 | 1.30 | 7.27 | | 7.43 |
| Mt. Liberty | 109 | 1.58 | 7.47 | | 7.59 |
| Centerburg (6) | 114 | 2.08 | 7.57 | | 8.19 |
| Condit | 120 | 2 22 | 8.11 | | 8.24 |
| Sunbury | 124 | 2.31 | 8 20 | | 8.35 |
| Galena | 126 | 2.36 | 8.26 | | 8.41 |
| Westerville | 133 | 2.51 | 8 42 | | 8.58 |
| Columbus (7) | 145 | 3.15 | 9.06 | | 9 23 |

GOING NORTH.

| STATIONS. February 20, '82. | | Thro' Pass'gr 1 | Mail Expr 3 | Accom 5 | Accom 7 |
|---|---|---|---|---|---|
| | | A.M. | P.M | | P.M. |
| Columbus | 0 | 6.00 | 12.15 | | 5.06 |
| Westerville | 12 | 6 25 | 12 41 | | 5.32 |
| Galena | 19 | 6.41 | 12.57 | | 5.49 |
| Sunbury | 21 | 6.47 | 1.03 | | 5.55 |
| Condit | 25 | 6.56 | 1.13 | | 6.06 |
| Centerburg | 31 | 7.10 | 1.27 | | 6.20 |
| Mt. Liberty | 36 | 7.20 | 1.38 | | 6.32 |
| Mt. Vernon | 45 | 7.43 | 2.02 | | 6.59 |
| Gambier | 50 | 7.55 | 2.15 | | 7.11 |
| Howard | 54 | 8.05 | 2.25 | | 7.23 |
| Danville | 59 | 8.15 | 2.36 | | 7.34 |
| Gann | 68 | 8.30 | 2.50 | | 7.49 |
| Black Creek | 71 | 8.56 | 3.15 | | 8.15 |
| Killbuck | 77 | 9.10 | 3.28 | | 8.29 |
| | | | | A.M. | |
| Millersburg | 83 | 9.26 | 3.43 | 5.50 | 8.42 |
| Holmesville | 89 | 9.37 | 3.55 | 6.05 | |
| Fredricksburg | 93 | 9.49 | 4.06 | 6.18 | |
| Orrville | 106 | 10.23 | 4.43 | 6.50<br>7.10 | |
| Marshallville | 112 | 10.35 | 4 55 | 7.23 | |
| Warwick | 117 | 10.46 | 5.09 | 7.37 | |
| Clinton | 118 | 10.52 | 5.15 | 7.46 | |
| Akron | 131 | 11.28 | 5.47 | 8.22 | |
| Cuyahoga Falls | 137 | 11.41 | 6.00 | 8.35 | |
| Hudson | 145 | 12.00 M | 6.18 | 8.55 | |
| Cleveland | | 1.15 P.M | 7 25 | 10.10 | |

N. MONSARRAT, Gen'l Supt. Akron, O

E. T. AFFLECK, General Passenger Ag't, Columbus, O.

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**7:10A.M. LIGHTNING EXPRESS,** (daily,) sleeping and hotel coaches from Leavittsburg. 8:55 a.m. To New York, Albany and Boston without change. Parlor car, Cleveland to Salamanca. Arrives at Meadville 11:20 a.m., (dinner); Franklin, 12:33 p.m.; Oil City, 1:00 p.m.; Corry, 1:00 p.m.; Jamestown, (Lake Chatauqua) 1:57 p.m.; Buffalo, 6:15 p.m.; Rochester, 8:30 p.m.; Hornellsville, 6:40 p.m., (supper); Corning, 8:25 p.m.; Elmira, 8:57 p.m.; Binghampton, 10:38 p.m.; Albany, 6:00 a.m.; Boston, 2:45 p.m.; arriving at New York, 6:50 a.m.

**10:45 P.M. NIGHT EXPRESS,** (daily except Sunday), Sleeping Coach from Leavittsburg to New York without change. Arrives at Youngstown 1:45 a.m.; Meadville, 3:50 a.m.; Corry, 5:20 a.m.; Jamestown, 6:22 a.m.; Buffalo, 9:45 a.m.; Rochester, 1:10 p.m.; Hornellsville, 11:20 a.m.; Corning, 12:53 p.m.; Elmira, 1:21 p.m.; Binghampton, 2:50 p.m.; New York, 9:25 p.m.

**2:30 P.M. PITTSBURGH EXPRESS,**—daily, through without change. Parlor Car, Cleveland to Pittsburgh, arrives at Youngstown, 5:00 p.m.; Pittsburgh, 8:25 p.m.; Washington, 7:30 a.m.; Baltimore, 8:15 a.m.; via Sharon and Sharpsville to Meadville 7:40 p.m.

**4:25 P.M. MAHONING ACCOMMODATION,** stopping at all way stations. Arrives at Youngstown, 7:30 p.m; Sharon, 8:30 p.m; Sharpsville 8:40 p.m; connects at Leavittsburg with train No. 20 for Meadville and intermediate points, arrives at Meadville, 11:05 p.m.

**7:10 A.M. PITTSBURGH EXPRESS,**—(daily) through without change. Arrives at Youngstown, 10:00 a.m.; Sharon, 10:55 a.m.; Sharpsville, 11:05 a.m.; Pittsburgh, 1:08 p.m. Returning, leave Pittsburgh, 4:48 a.m., 8:55 a.m., and 1:13 p.m. and 4:20 p.m.

**11:15 A.M. YOUNGSTOWN & PITTSBURGH** Accommodation, stopping at all Way Stations, arriving at Youngstown 2:10 p.m.; Pittsburgh, 6:10 p.m. Trains arrive at Cleveland, 6:50 a.m., 10:55 a.m. 3:10, p.m. 7:00 p.m., and 10:15 p.m.

☞ This is the only route by which passengers can reach Corry, Elmira, Binghampton, New York City, and intermediate points WITHOUT CHANGE. No change to Boston and New England cities.

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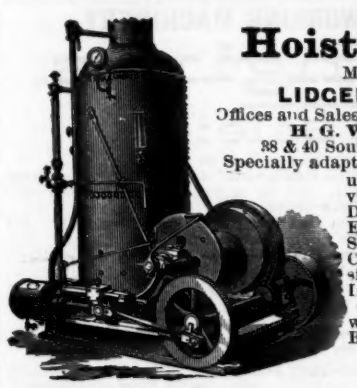

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Down-draft Base Heating Furnaces and School Room Ventilating Stoves,

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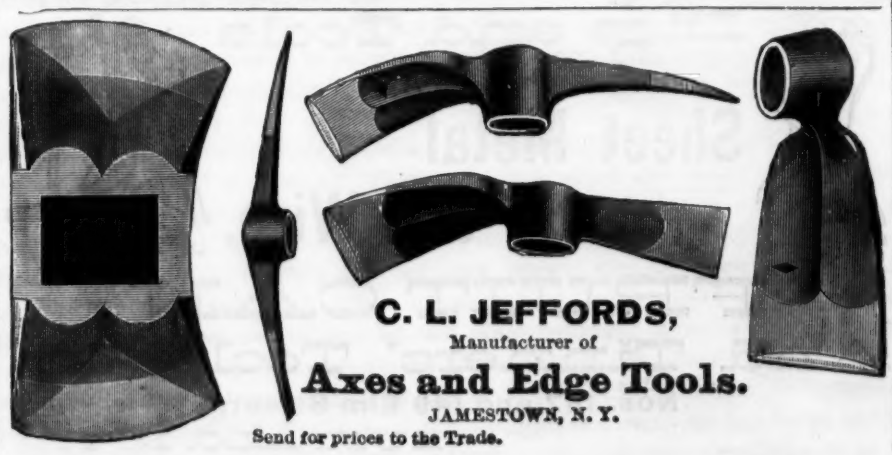

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Send for prices to the Trade.

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## CLEVELAND & PITTSBURGH RAILROAD.

Condensed Time Table of Passenger Trains, corrected to May 14, 1882.

MAIN LINE—GOING WEST.

| | Day Expr'ss. | Mail Expr'ss. | Fast Line. | Accom. |
|---|---|---|---|---|
| Leave Pittsburgh | 7 30 a.m. | 2 00 pm | 11 50 pm | ..... |
| Allegheny | 7 40 | 2 10 | 12 00 am | ..... |
| Arrive Rochester | 8 23 | 3 00 | 12 50 | ..... |
| Beaver | 8 30 | 3 05 | 12 55 | ..... |
| E. Liverpool | 9 08 | 3 37 | 1 37 | ..... |
| Wellsville | 9 18 | 3 47 | 1 50 | ..... |
| Salineville | 9 57 | 4 31 | 2 33 | ..... |
| Bayard | 10 34 | 5 07 | 3 21 | ..... |
| Alliance | 11 05 | 5 30 | 3 55 am | ..... |
| Leave Alliance | 11 10 | 5 30 | 4 05 | 7 30 am |
| Arrive Ravenna | 11 48 | 6 04 | 4 47 | 8 15 |
| Hudson | 12 13 p.m. | 6 28 | 5 15 | 8 50 |
| Cleveland | 1 15 p.m. | 7 30 pm | 6 30 am | 10 10 am |

Accommodation train leaves Ravenna at 6.45 a.m., arrives Hudson 7.15 a.m., Cleveland 8.35 a.m.

☞ Fast Line and Western Express run Thro' Sleeping Car, Pittsburgh to Cleveland.

NOTE.—Fast Line leaves Pittsburgh Sunday nights, but not on Saturday nights.

MAIN LINE—GOING EAST.

| | Pittsb'g Expr'ss. | Fast Line. | Day Expr'ss. | Accom. |
|---|---|---|---|---|
| Leave Cleveland | 8 00 am | 1 45 pm | 11 40 pm | 3 45 pm |
| Arrive Hudson | 9 05 | 2 43 | 12 50 am | 4 50 |
| Ravenna | 9 37 | 3 08 | 1 18 | 5 20 |
| Alliance | 10 20 | 3 40 | 2 05 | 6 05 pm |
| Bayard | 10 54 | 4 03 | 2 49 | ..... |
| Salineville | 11 40 | 4 37 | 3 40 | ..... |
| Wellsville | 12 20 pm | 5 14 | 4 35 | ..... |
| E. Liverpool | 12 54 | 5 44 | 4 57 | ..... |
| Beaver | 1 30 | 6 17 | 5 47 | ..... |
| Rochester | 1 35 | 6 22 | 5 52 | ..... |
| Allegheny | 2 30 | 7 05 | 6 45 am | ..... |
| Pittsburgh | 2 40 | 7 15 | 6 55 | ..... |
| Harrisburg | ..... | 3 50 am | 4 00 pm | ..... |
| Baltimore | ..... | 7 30 | 7 20 | ..... |
| Washington | ..... | 9 02 | 8 47 | ..... |
| Philadelphia | ..... | 7 20 | 7 35 | ..... |
| New York | ..... | 10 25 | 10 35 | ..... |
| Boston | ..... | 8 00 pm | ..... | ..... |

Accommodation train leaves Cleveland Union Depot at 5.35 p.m., arrives Hudson 6.55 p.m., Ravenna 7.25 p.m.

All trains connect at Yellow Creek for Wheeling and Bellaire.

☞ Fast Line runs Through Sleeper to New York. Day Express runs Through Sleeper to Pittsburgh.

TUSCARAWAS BRANCH.

Trains leave Bayard at 11.00 a.m. and 5.10 p.m. arrive Minerva 11.08 p.m. and 5 20 p.m.: arrive Dover 12.18 p.m. and 7.15 p.m., New Philadelphia 12.30 p.m. and 7.30 p.m. Returning leave New Philadelphia at 7.00 a.m. and 2.05 p.m., Dover at 7.30 a.m. and 2.15 p.m., Minerva at 9.45 a.m. and 3.23 p.m., arrive Bayard at 10.00 a.m. and 3.33 p.m.

All trains daily except Sunday.

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Pittsburgh, Pa.

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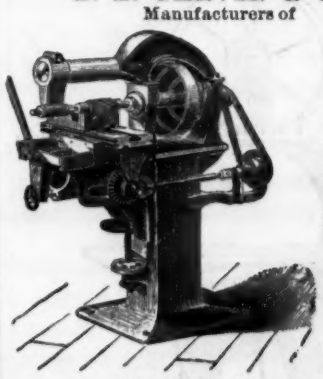

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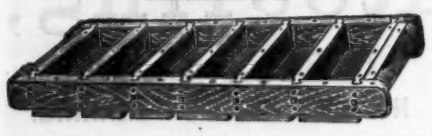
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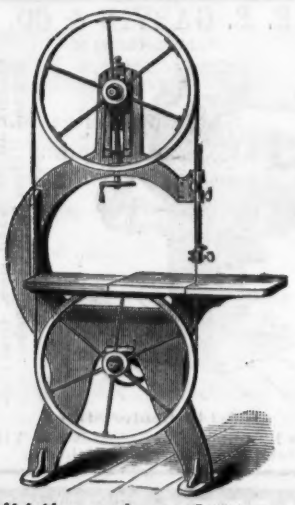
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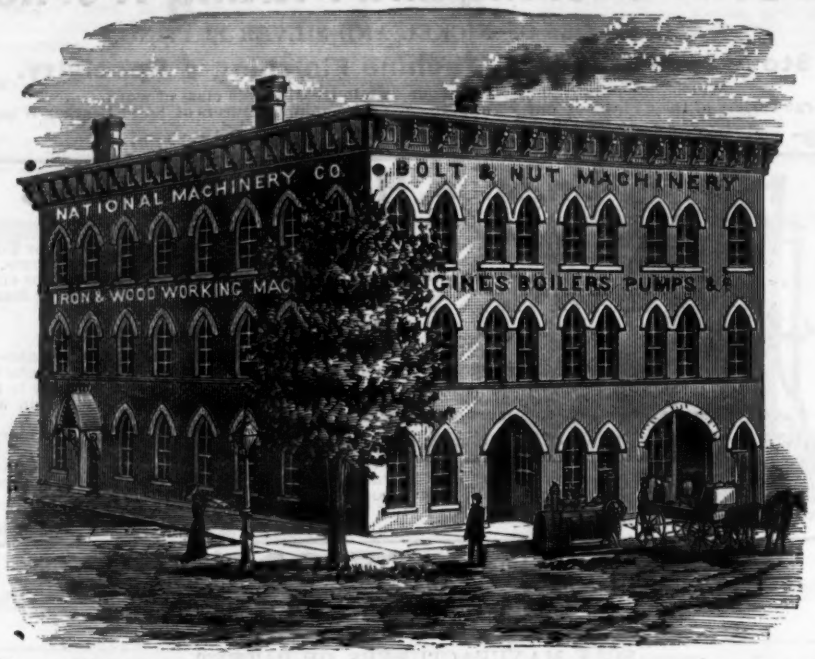

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One Thorn and DeHaven Drill.
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One 12-horse power Engine.
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One portable Engine and Boiler 7½x10, mounted on wheels. All in complete order. Used only about three years.
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One second-hand Frank two-spindle Shaper, $65.
One " " wood frame 2-spindle Shaper, $35
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One " " " " Spoke and Handle Lathe $125
One " " 22 inch Greenwood Heading Planer, $125
One " " Ellis Blind Slat Tenoner.
One " " 24-inch Ball & Co., Planer and Matcher.
One " " Power Rod and Dowell machine
One " " Fay & Co. No. 1 Railway Cut-off Saw.
Two " " Sandpaper Drums.
One second-hand Dimension Planer, 24-inches, with Feed attachment.
One " " wood frame swing Cut-off Saw and Table.
One " " Slotting machine.
One " " Thorn & Dehaven Drill.
Two " " Saw Tables.
One wood frame 6 inch Sticker.
Large lot second-hand Trenton Vises.
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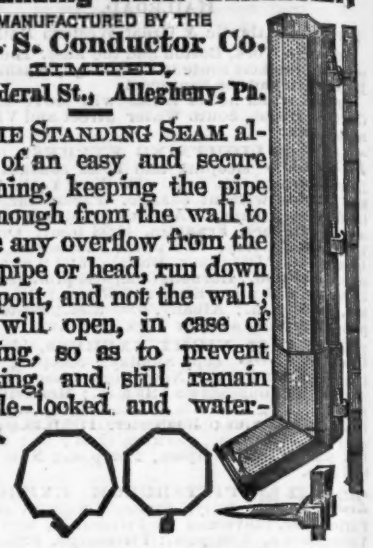
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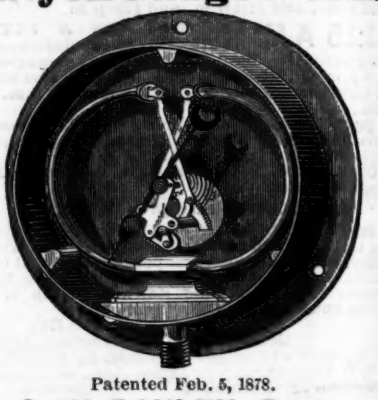
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